JOURNAL OF ENGINEERING EDUCATION

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THE AMERICAN SOCIETY FOR ENGINEERING EDUCATION

OCTOBER, 1961 Vol. 52, No. 1

THE NEWEST IN ENGINEERING TEXTS FROM MACMILLAN

PLANT LAYOUT AND DESIGN

James M. Moore, Clarkson College of Technology

Emphasizing application rather than theory, this book integrates all aspects of the plant layout problem and gives students the opportunity for practical experience through use of carefully selected problems. The author introduces a vital new concept—the application of quantitative operations research tools to increase the effectiveness of plant layout. *September, 1961*

ELEMENTS OF PRODUCTION PLANNING AND CONTROL

Samuel Eilon, Imperial College of Science and Technology, University of London

Using a quantitative, analytical approach, the author treats the interrelations of such factors as design, marketing, and forecasting capacity evaluation. There are detailed discussions of quality control, production and inventory management in both batch and continuous production. *Spring, 1962*

MATERIALS AND PROCESSES IN MANUFACTURING, Second Edition

E. Paul DeGarmo, University of California, Berkeley

The second edition of this text is directed towards the engineer who plans to design parts and products that may be manufactured economically. Emphasizing processes rather than machines, the author devotes special attention to economics, machine capabilities, accuracy, and degree of labor skill required. New material includes expanded discussion of cold forming operations such as thread rolling and cold forging, and more quantitative problems. *Spring, 1962*

THERMODYNAMICS, Fourth Edition

Virgil M. Faires, U. S. Naval Postgraduate School, Monterey, California

The newest edition of this popular text provides a balanced treatment of the applied and theoretical aspects of thermodynamics, with emphasis on basic principles. Material on the following topics has been expanded; tabular properties of gases, transient flows, turbojet and rocket propulsion, fluid flow, dissociation and the equilibrium reaction, imperfect gases, and general mathematical relations of properties. There are numerous illustrations—more than half of which are new—and an extensive list of references for students who plan further study. *Spring, 1962*

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by REUBEN M. OLSON, the University of Minnesota

This book provides a basic treatment of the properties of fluids and the principles of fluid behavior. Application of the principles to practical problems in the areas of hydraulics, hydrodynamics, gas dynamics, and boundary layer theory is stressed. 404 pages. $8.50. 1961.

KINEMATICS AND DESIGN OF MECHANISMS

by ALEXANDER COWIE, Illinois Institute of Technology

A presentation of up-to-date methods for the analysis and design of cams, gears, and linkages. It is a unique approach to kinematic analysis which emphasizes the point path and the position vector, and does not require a complicated notation. 449 pages. $8.50. 1961.

THE INTERNAL COMBUSTION ENGINE, 2d Ed.

by C. FAYETTE TAYLOR and EDWARD S. TAYLOR, both of the Massachusetts Institute of Technology

This book, based on the authors' wide experience, is an authoritative work on the study of internal combustion engines. The primary aim is to provide analytical methods which lead to a basic understanding of engine behavior and to furnish quantitative data which are useful in design. 669 pages. $12.50. 1961.

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Annual Meeting: U. S. Air Force Academy, Colorado, June 18-22, 1962

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Five Fellowships are open for post-doctoral study at the Center for the Study of Higher Education at The University of Michigan. Grantees become Michigan Fellows in College Administration. Fellowships are graduated according to need, with a maximum of $8,000.

The fellowships are open to those entering or intending to enter careers in college or university administration. To qualify, the applicant must have his doctor's degree (the field of study is immaterial), or the equivalent, and have demonstrated leadership potential. He should be no more than forty years of age.

A few predoctoral fellowships with a maximum grant of $3,500 will be available for outstanding doctoral candidates. Some of these are intended for junior college administration and are available also at Michigan State and Wayne State Universities. At least a year of outstanding graduate study (in any academic field) is a prerequisite.

Applications should be on file by February 1, 1962. For application forms and further information address: Center for the Study of Higher Education, The University of Michigan, Ann Arbor, Michigan.

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MH COLLEGE DIVISION

PEACETIME USES OF OUTER SPACE

Edited by SIMON RAMO, Thompson Ramo-Woolridge, Inc. 295 pages, $6.75.

This remarkable volume brings together outstanding scientists, educators, politicians, and businessmen for an examination of the coming space age. Emphasizing the peacetime, non-military aspects of space technology, the book seeks to heighten public responsiveness to the full impact of science and technology in shaping our future. Contributors include: Leston Faneuf, J. H. Doolittle, Lloyd V. Berkner, Congressman Overton Brooks, Ralph J. Cordiner, Willard F. Libby, Vice Admiral John T. Hayward, Joseph Kaplan, Morris Neiburger, Brigadier General Don D. Flickinger, Leo Goldberg, Edward Teller, and Frederick R. Kappel.

PLANNING A COMPUTER SYSTEM: Project Stretch

Edited by W. BUCHHOLZ, IBM Corporation. Available in January, 1962.

This book is primarily concerned with the selection of an instruction set and related functional characteristics of a high-speed digital computer. The specific subject of the work is the powerful and highly sophisticated computer: the IBM 7030. The authors of individual chapters have actively participated in the design project developing this computer and the text thus reflects the substance of direct personal experience. Reasons are given for various design choices and compromises between conflicting requirements are analyzed. Numerous original ideas discussed.

GROUND SUPPORT SYSTEMS FOR MISSILES AND SPACE VEHICLES

By KENNETH BROWN and PETER B. WEISER, University of California, Los Angeles. *University of California Engineering Extension Series.* Available now.

Presenting a complete description of the systems required to support either a missile or a space vehicle. Directed toward the engineer having no prior acquaintance with ground support systems, the text approaches the system as a whole unit—assuming that the missile is merely one small portion and that each of the subsystems involved is merely an integral part of the overall system. All subsystems are considered with full discussions of recent advances.

AUTOMATIC CONTROL ENGINEERING

By FRANCIS H. RAVEN, University of Notre Dame. *McGraw-Hill Mechanical Engineering Series.* Available in October, 1961.

A text in control engineering aimed primarily at mechanical engineers. Its aim is to develop and explain the principles of feedback control systems in a manner appropriate to such readers. The first half of the book is concerned with the principles and fundamental concepts of feedback control systems; the latter half correlates basic theory with the more practical aspects involved in the design of feedback systems.

ELECTROMAGNETIC FIELDS AND WAVES

By ROBERT V. LANGMUIR, California Institute of Technology. 227 pages, $9.75.

A senior or first-year graduate text for courses in electromagnetic theory. The book covers: electrostatics, radiation including plane waves, waveguides, spherical radiation, and propagation in unusual structures such as over the surface of the earth. Eddy current problems are extensively discussed and a short treatment of traveling and standing waves is given.

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LINEAR VACUUM TUBE AND TRANSISTOR CIRCUITS: A Unified Approach to Linear Active Circuits

By A. J. COTE, JR., and J. BARRY OAKES, The Johns Hopkins University. *The McGraw-Hill Electrical and Electronic Engineering Series.* 411 pages, $10.75.

This senior-graduate level text presents a basic approach to the analysis and synthesis of linear vacuum tube and transistor circuits, and emphasizes the difference and similarities between these two devices. This viewpoint permits the designer to select the optimum combination of external passive elements that will make the best use of the device employed in a particular application.

PRINCIPLES OF LINEAR NETWORKS

By BERNARD FRIEDLAND, Melpar, Inc.; and OMAR WING and ROBERT ASH, of Columbia University. *McGraw-Hill Electrical and Electronic Engineering Series.* 270 pages, $8.95.

A concise introduction to linear electric circuits which gives a careful, balanced presentation of all the concepts of circuit theory needed for undergraduate work in electronics, energy conversion, and other subjects in the curriculum. Emphasis is placed on basic principles which are introduced in order of importance, rather than on subsidiary details. Presupposes a knowledge of differential equations.

PROBLEMS IN APPLIED DESCRIPTIVE GEOMETRY

By MATTHEW McNEARY, University of Maine. Available now.

A workbook designed primarily to supply problems for use with Warner-McNeary's APPLIED DESCRIPTIVE GEOMETRY, Fifth Edition, although with minor modifications in nomenclature it can be used with any standard text. Each of the 21 teaching units consists of theoretical exercises followed by applied problems to help the student in transferring his knowledge to actual situations. A special group of difficult problems to challenge superior students is appended.

CREATIVE PROBLEMS IN ENGINEERING GRAPHICS

By ERNEST R. WEIDHAAS, The Pennsylvania State University. 120 pages, $4.95.

An engineering graphics book entirely in keeping with the trend toward engineering science. Problems on 35 sheets are directed primarily toward developing the faculty of decision in creative design. Although the traditional topics are covered, the student approaches each in the sequence: idea, design sketch, design drawing.

ELECTRIC MACHINERY, Second Edition

By A. E. FITZGERALD, Jackson & Moreland, Inc., and CHARLES KINGSLEY, JR., M.I.T. *McGraw-Hill Electrical and Electronic Engineering Series.* 568 pages, $10.75.

A thorough revision of a text that has been a cornerstone of many undergraduate EE curricula. The main characteristic of the revision is the reorganization of the material to make it even more widely adaptable to the individual preferences of instructors. Electro-mechanical energy conversion is still the theme; increased emphasis is given to dynamic systems. Technical excellence of first edition retained.

THE PHYSICAL THEORY OF TRANSISTORS

By LEOPOLD B. VALDES, Rheem Semiconductor Corporation, California. *The McGraw-Hill Electrical and Electronic Engineering Series.* 370 paegs, $10.95.

A textbook for a graduate course in the hybrid field called transistor physics. It is planned for a course on the theory of diodes and transistors, with primary emphasis on the internal structure of these devices. To analyze the flow of current through semiconductor materials and to derive relationships between the electrical characteristics of transistors and their physical structure are the final objectives of the text.

Do You Know

● That the most outstanding characteristic of last June's Annual Meeting was the active support of the entire administration and faculty of the University of Kentucky? From the early planning stages all through the meetings it was apparent that everyone from President Frank G. Dickey down was interested in assuring the success of the meeting. President Dickey participated in the programs and attended more of the functions than merely those which are the usual routine for the President of the host institution or his representative. And Mrs. Dickey was active in developing many of the plans and participated enthusiastically in the women's program. On the various committees and in the working groups there were faculty men and wives from various colleges outside of engineering. The business office, dean of men, etc., etc., all contributed. So, if you wonder why our meetings are successful the answer is that it is becoming more and more common for "top administration" to provide tangible leadership and support. It is a tribute to an institution that it is willing to make this kind of effort, and it is a tribute to ASEE that they make it. Every member of ASEE, whether he went to the Annual Meeting or not, owes a debt of gratitude to all of those who served on the various committees at the University of Kentucky!

● That ASEE no longer can be accused of being an old man's organization? A total of 2,622 came to Lexington from more than 400 colleges, universities, institutes, companies, and other organizations. This is an all time high! Included were over 422 children—what further proof is needed of virile membership? It also is pertinent to note that slightly more than 50 per cent of the 1,028 new members last year were under 36 years of age.

● That Kentucky also showed its hospitality by commissioning President Eric A. Walker and Secretary W. Leighton Collins to be Kentucky Colonels? President Frank G. Dickey, on behalf of Governor Bert Combs, presented President Walker with his commission at the Monday dinner meeting for the members of the General Council and their wives, and then "snuck" in the presentation to the Secretary as a surprise "wind-up" to the Annual Banquet.

● That Dr. R. H. Roy, Dean of the School of Engineering at Johns Hopkins University, is the new chairman of ECAC? The new secretary is L. H. Johnson, Dean of the College of Engineering at Tulane University. A roster of officers and committees will be found on page xxv.

● That copies of the Proceedings of the first conference on "Engineering Design Education" are still available from ASEE headquarters at no cost? The invitational conference was held about a year ago at Case Institute of Technology in cooperation with the American Society for Engineering Education and was financed by Ford Foundation grants to Case, UCLA, MIT, and Carnegie Tech.

● That copies of the "ASEE-AGC Survey of Construction Education" are now available? The report lists the construction-related programs and course offerings in all schools having accredited curricula in architecture, architectural engineering, and civil engineering in the United States, and was prepared by D. A. Day of the University of Colorado on behalf of the Joint Cooperative Committee of the ASEE and the Associated General Contractors of America. Copies may be obtained from A.G.C., 20th and E Sts., Washington 6, D. C. for 50 cents per copy.

● That the "Report on Objective Criteria in Nuclear Engineering Education" is now available? Copies may be obtained from ASEE headquarters for 25 cents

each. The report is the result of the jointly sponsored ASEE-ANS project financed by the Atomic Energy Commission. A sufficient number of related questions arose during the preparation of the report that a supplemental contract was signed for continuing the study for another year. Dr. Glenn Murphy of Iowa State is the chairman of the 30-man committee making the study. The 16-page report is devoted almost entirely to a discussion of the characteristics of nuclear engineering, prerequisites for graduate study, a discussion of the M.S. and Ph.D. programs, the role of nuclear engineering and other graduate programs, and a series of seven recommendations.

● That three new Leeds and Northrup Industrial Fellowships have been established? One is at North Carolina State for the first of a three-year Ph.D. program, and the other two are at the University of Wisconsin and the University of Kansas for one-year programs leading to the M.S. degree. This industrial fellowship program was undertaken with much enthusiasm a few years ago in the belief that smaller industries unable to administer a graduate fellowship program of their own or which did not wish to select institutions would be interested in having ASEE administer the program in an impartial manner. Except for the continued support of the Leeds and Northrup Foundation, the results have been disappointing. The Relations with Industry Division has been assigned the promotion of this Society activity along with the more comprehensive charge of encouraging all types of corporate support for higher education.

● That the 1961 *Research Review* is now available at $4.00 per copy? Orders should be sent to Society headquarters and payment should accompany the order. Data on over 11,000 research projects in 121 engineering colleges of the United States are reported on. The total value of the projects is over $180,000,000. There is no other similar source of such comprehensive data on research in colleges of engineering. The *Research Review* is a biennial publication of the Engineering College Research Council.

● That engineering received only 15 per cent of the monies colleges and universities spent for facilities and other capitol items needed for research and development purposes in 1958? Of the $154,000,000 total, 50 per cent went to the life sciences, 33 per cent to the physical sciences, and 3 per cent to the social sciences. The large percentage in the life sciences reflect the need for costly medical school facilities. Approximately ¾ of the total funds came from non-federal sources, the institutions own funds, state appropriations, or private endowments. These data come from Reviews of Data on Research and Development, No. 28, "Capitol Expenditures for Research and Development in Colleges and Universities, fiscal year 1958". The data were collected by the National Science Foundation by the department of Health, Education, and Welfare. Copies may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 5¢ each.

● That the JOURNAL now is being printed by the Illinois Printing Company of Danville, Illinois? This is the same company that printed the *Yearbook-Directory* last year. The change from Lancaster Press was made with much regret and nostalgia, because the JOURNAL and *Proceedings* have been printed there for such a long period of time. For the years 1892 and 1893, the *Proceedings* were printed by "E. W. Stephens, Printer" of Columbia, Missouri. From then until 1924 the *Proceedings* bore the imprint of "The New Era Printing House, Lancaster, Pennsylvania." From 1924 on, when the *Proceedings* was changed from an account of what went on at the Annual Meeting to a compilation of the articles printed in the JOURNAL during the fiscal year, the JOURNAL was printed by Lancaster Press. It has been the custom of ASEE to appoint a printing economy committee about every five years to make a study of the cost of printing the JOURNAL. A thorough study indicated that a savings of some 8 to 10 per cent could be made by changing printers without lowering the quality or decreasing the

services. In addition, the lead time for submitting manuscripts is considerably decreased and Illinois Printers, being only 30 miles away, has a representative in Urbana at least three days every week. The cooperation of Lancaster Press and its Mr. Robert H. Mann has been most sincerely appreciated and is hereby acknowledged by both Editor P. T. Bryant and Secretary W. Leighton Collins.

● That ASEE's contractual procedures for cooperating with other organizations on special studies or support of programs have been further clarified? In last February's "Do You Know" it was stated that ASEE will sponsor, co-sponsor, cooperate, or approve projects. The meaning of each of these words in terms of obligations is further amplified by the following chart.

CHART OF CONTRACT STUDY MANAGEMENT

A=ASEE B=Other Party

*ASEE says it is a good idea that needs doing #Decide A or B before signing contract	Approval*	Cooperate	Cosponsor #	Sponsor
Who holds original contract	B	B	A or B	A
Who pays bills (subcontract)	B	B	A or B	A
Who keeps indirect costs	B	B	A or B	A
Who appoints Advisory Comm.	B	B with A's help	A & B	A
Who appoints director	B	do	A & B	A
Who guarantees quality	B	do	A & B	A
Who issues report	B	B	A or B	A
Who follows up	B	B	A or B	A

● That the "Teaching Positions Available" section of the JOURNAL contained 1,490 lines of paid advertising last year? The new "Teaching Positions Wanted" section contained 116 lines. The charges for both are $2 per line or portion thereof per month. It is requested that this later service be called to the attention of those in industry and the armed services who wish to enter the teaching profession. And to make this service to potential teachers most useful, it is important that ads for Positions Available, particularly those for which industrial experience is desirable, be listed in the JOURNAL.

● That an "S" probably will be added to the three R's of elementary and junior high school education? The report of a study undertaken by the American Association for the Advancement of Science, and financed by NSF, calls for a coordinated ten-year sequence of science as an important thread of a general education to equip all persons for life in a scientific and technological society. A team effort of scientists and educators will be required to produce high quality materials for a major improvement in elementary and junior high school science teaching. The present plan emphasizes basic ideas used in science as well as a scientific method, without dividing the instruction into traditional categories. The report is entitled "Science Teaching in Elementary and Junior High Schools" and was published by AAAS in *Science*, the June 1961 issue.

● That the ASEE summer school on "Research in Processing, in Industry, and in Engineering College Curricula and Teaching" had an attendance of 40? The material prepared for the summer school and the papers presented are available from G. E. Seeley, Director of Education, American Society of Tool and Manufacturing Engineers, 10700 Puritan Avenue, Detroit 38, Michigan. There is no charge for the papers. The attendance was less than expected, but the program was good.

● That since the ASEE headquarters were moved to the University of Illinois in February of 1955 it has been necessary to increase the floor area used by the Society from 600 to 1400 sq. ft.? This includes wash rooms and the storage space for Society publications, but not stairways. The headquarters' staff constitutes 10 "bodies," or a full-time equivalent of 8.75 persons, plus occasional extra clerical help. By contract, the University of Illinois provides the space rent-free and maintains the building and grounds.

W. LEIGHTON COLLINS
Secretary, ASEE

NEW REINHOLD BOOKS

WATER TREATMENT FOR INDUSTRIAL AND OTHER USES—Second Edition
By Eskel Nordell, *The Permutit Company*
1961, 608 pages, $12.00

FLOW OF FLUIDS THROUGH POROUS MATERIALS
By R. E. Collins, *Associate Professor of Physics, University of Houston*
Reinhold Chemical Engineering Series, 1961, 280 pages, $12.50

DISTILLATION: PRINCIPLES AND DESIGN PROCEDURES
By Robert J. Hengstebeck, *Research Associate, American Oil Company*
Reinhold Chemical Engineering Series, 1961, approx. 343 pages, $11.50

FILTRATION
By George B. Dickey, *P. E., Consultant*
Reinhold Chemical Engineering Series, 1961, approx. 400 pages, $12.00

MOLECULAR SIEVES
By Charles K. Hersh, *Senior Engineer, Armour Research Foundation*
1961, 136 pages, $6.50

RARE METALS HANDBOOK—Second Edition
By C. A. Hampel, *Consultant*
1961, 7" x 10", 732 pages, $20.00

SCIENTIFIC THINKING AND SCIENTIFIC WRITING
By Martin S. Peterson, *Chief, Technical Services Office, Quartermaster Food and Container Institute for the Armed Forces*
1961, 224 pages, $6.95

MINIATURIZATION
By H. S. Gilbert, *President, Miniature Precision Bearings, Inc.*
1961, 320 pages, $10.00

CERAMICS
By William Lee, *Head, Porcelain Research Department, The Dentists' Supply Company*
1961, 215 pages, $5.95

PLASTICS IN NUCLEAR ENGINEERING
By James O. Turner, *Materials Engineer, Lawrence Radiation Laboratory, University of California, Berkeley*
Reinhold Plastics Applications Series, 1961, 154 pages, $5.50

SEPARATION PROCESSES IN PRACTICE
Edited by Robert F. Chapman, *R & D Department, The Atlantic Refining Company, Inc.*
1961, 216 pages, $4.95

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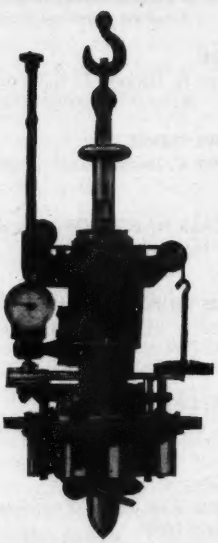

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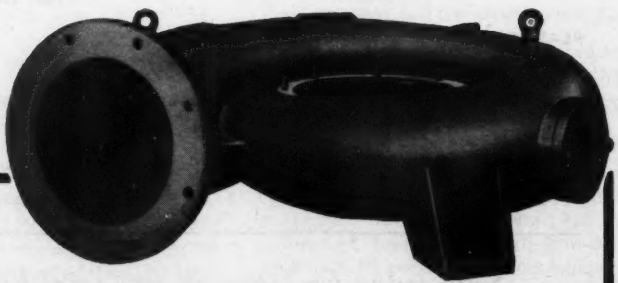

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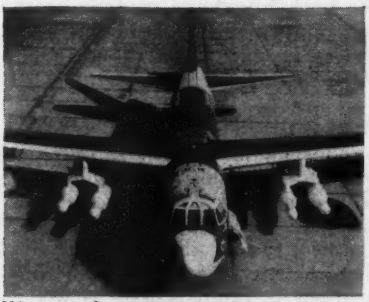

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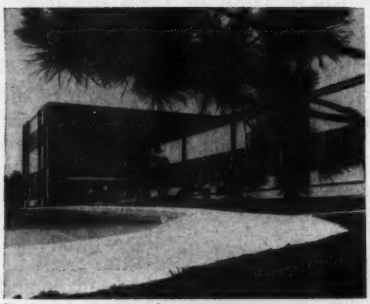

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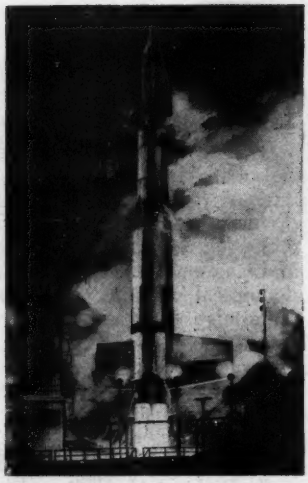

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Robert W. Van Houten

ASEE President 1961-1962

Robert W. Van Houten, ASEE's new president, brings to his task a tradition of service to engineering education that is oriented as much to public understanding of the importance of the engineer to society as it is to professional engineering itself.

Born in Newark, N. J., in 1905, he was educated in the Newark public schools and graduated in 1924 from the New Jersey State Normal School of that city. After teaching two years in high school, he entered Newark College of Engineering as a freshman student, received his B.S. in Civil Engineering in 1930, and the professional degree of Civil Engineer at NCE two years later.

He began his teaching career at NCE in 1930, and from then until 1949 rose steadily from Instructor, to Assistant Professor, to Associate Professor, Assistant to the President, Assistant Dean, Dean, Acting President, and President. His mentor during the years leading to the presidency was the late Allan R. Cullimore, NCE's second head and its first president, recipient in 1951 of the Lamme Medal, whose concept of the engineer's duty as a citizen has an historical significance to the profession of engineering in America which can never be overestimated.

Once the debt has been acknowledged, however, one can see in Robert W. Van Houten's personal record an imaginative and creative extension of the original stimulus into wholly new areas of action and experimentation.

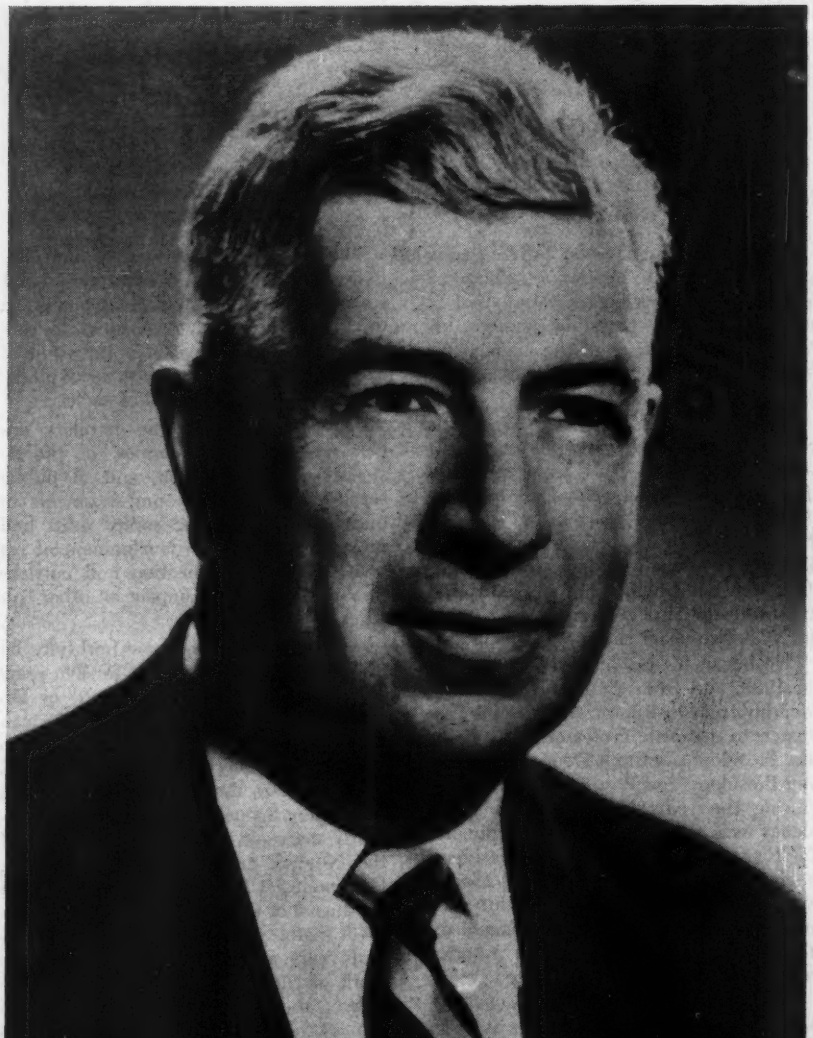
The tradition which he inherited, or perhaps it is better to say grew up in, is a tradition which insists that engineering is a profession which places heavy responsibilities on the individual in terms of high ethical standards and selfless devotion to the community.

The engineer, Dr. Van Houten believes, because of his special training and special aptitudes in logic and analytical thinking, is uniquely well-fitted to render exceptional service in government and in civic affairs, in every area of endeavor and on every level of society.

His emphasis upon the corollary importance of the humanities, of professional society affiliation, and of public service, in enabling young engineers to understand this philosophy has had must to do with the development of his own college's organization and curriculum and has had its impact on other colleges as well.

As an indication of how faithfully he practices what he preaches, for five years he was a member of the Board of Directors of the Newark Chapter, American Red Cross, and contributed actively to its committee work. In addition, he has been active in the Robert Treat Council of the Boy Scouts of America. He is currently active in the College Division of the Newark and West Hudson, N. J., Community Chest, and is a member of the Board of Directors of Junior Achievement in the same area. He was for several years an active participant in the work of the Newark Chamber of Commerce, and under its recent reorganization as the Newark Association of Commerce and Industry served as Chairman of its Education Committee.

Since 1948 he has been a member of the Board of Managers of Newark's Presbyterian Hospital and is Chairman of its House Committee. He is also on the Board of Trustees of the coordinated United Hospitals of Newark, which he serves as a member of the House Committee and as Chairman of the Budget Committee.



Robert W. Van Houten

He has been a member of the Rotary Club of Newark since 1938; has been Chairman at various times of its Program, Club Service, Special Problems, and Rotary Foundation Fellowship committees; was its President in 1947 and a member of its Board of Directors from 1945 to 1950.

He has been a member of the Official Board of Morrow Memorial Church in Maplewood, N. J., since 1937 and was its president from 1955 to 1957. From 1959 to 1961 he served as President of the Church's Board of Trustees. He is also a member of the Board of Trustees of the Millburn, N. J., Public Library.

To keep in trim for his arduous program of activities, administrative, civic and professional, Dr. Van Houten, whenever possible, plays tennis, and enjoys a somewhat less arduous but nevertheless intense interest in bridge and in music. He spends one precious month each year with his family at a favorite haunt on Lake George, N. Y., where he adds swimming to his list of sports, between bouts, that is, with his dictating machine, standard equipment for him wherever he goes.

Dr. Van Houten has been a member of ASEE since 1933 and was Chairman of the Evening Engineering Education Division in 1952. From 1953 to 1954 he was a member of the Committee on Promotion of Ethical Standards. From 1953 to 1957 he was a member of both the General Council and the Committee on Ethics. From 1954 to 1958 he was a member of the Committee on the George Westinghouse Award, and was a member of the Nominating Committee in 1954 and in 1956.

From 1955 to 1957 he served on the Committee on Survey of Teaching of English in Colleges of Engineering and on the Committee on Sections and Branches. During the same years he was ASEE's representative on the Finance Committee of Engineers Joint Council. From 1956 to 1958 he was on the Policy Committee; from 1956 to 1960 on the Loss of Faculty to Industry Committee.

He was Vice President for Eastern Sections from 1957 to 1959, was appointed a delegate to the American Council on Education to serve from 1959 to 1962, to the Lamme Award Committee to serve from 1959 to 1963, and as a continuing member of the Constitution and Bylaws Committee starting in 1960.

He has represented his college since 1953 on the American Council on Education, is a former Vice Chairman of the Council and now serves as a member of the Committee on Relationships of Higher Education to the Federal Government and of the Committee on Urban Renewal. He is also NCE's representative to the Association of Urban Universities, of which he is a past president, and to the N. J. Association of Colleges and Universities, of which is is also a past president. From 1954 to 1961 he was a member of the Advisory Panel on ROTC Affairs of the U. S. Department of Defense.

He is a Fellow of the American Society of Civil Engineers, a member of the Association for Higher Education, a member of the National Society of Professional Engineers, the N. J. Education Association, and the N. J. Society of Professional Engineers, whose Citizen of the Year Award he received in 1958. He is also a member and has been a trustee of the Essex County Society of Professional Engineers. He is president and a director of the privately incorporated Newark College of Engineering Research Foundation.

As long as engineers are content, Dr. Van Houten believes, to work hidden away within the ranks of industry or quietly within their own small companies or strictly as engineering consultants, they will never attain a truly professional status.

The key to the mark of professionalism, he has stated many times, lies in the word *service*, to one's company first, but additionally to the larger world which gave the engineer his education and which needs his talents so desperately. Service, he insists, is the mark of the true professional engineer and his personal sense of service is the chief quality he brings to ASEE.

Ancient Society for Eliminating Engineers?

Presidential Address

ERIC A. WALKER

President, The American Society for Engineering Education, 1960-1961

Every speech, sooner or later, becomes involved with a "gimmick," or what I believe the advertising people call a "hook"—that is, something—a quotation, a phrase, a figure of speech, or some such —that can be used to give a measure of unity to the piece. Antony's repetition of the phrase, "for Brutus is an honourable man," is a notable example of the sort of thing I'm talking about. Unfortunately, Shakespeare has already pre-empted that one, and I had to look for another, although I was tempted to use the line that follows: "So are you all—all honourable men."

In thinking about this problem, I became interested in the letters "ASEE." All of us here this afternoon know exactly what these letters stand for. Or do we?

They might, for instance, stand for "Assembled Surveyors of Energetic Enterprise." There is, in fact, considerable justification for believing that they might. Engineers have always prided themselves on being men of action and energy, a word that has an interesting double meaning in this instance, as does the word "surveyor." So also does the word "assembled," implying, as it does, not only an annual meeting such as we are here attending but also a connection with industrial processes.

But the aptness goes deeper than a mere play on words, however appropriate.

Presented at the Sixty-Ninth Annual Meeting, American Society for Engineering Education, Lexington, Kentucky, June 26, 1961

This year, for example, the Society enrolled its 10,000th member, making it, in terms of physical size, a truly significant national organization. From an organization of engineers and engineering educators of this size, much should be expected. And, in fact, much has been accomplished this year.

This year, for example, we have corrected a long-standing inequity by making it possible for each industrial member of the Society to name an official representative who will enjoy all the rights and privileges held by individual members of the Society and who will—hopefully—accept all the responsibilities that individual members should accept. Through this action, each industrial member is now officially represented in the Society.

Technical Institute Council

Further, we have established the Technical Institute Council, with the chairman to serve as a vice president of the Society and as a member of the Executive Board. Over the past years, as many of you must surely know, the Technical Institute Division has come to be dominated by the administrators. This, it seems to me, was logical. Surely, these people were faced with problems peculiar to their own type of institution, and certainly they very much needed a forum at which they could discuss these problems among themselves.

However, this left their faculty members without a home to call their own. At first, it was felt that this need would be satisfied through the regular divisional

meetings and structure. But this didn't work. These faculty members are concerned with programs basically different from those with which their four-year-institution colleagues are concerned. They seek to satisfy different aims and objectives. They must use different methods. The nature of their commitment to research is different.

The formation of the Technical Institute Council gives the administrators their own congress in order that the Division itself can be made to serve better the needs of the majority of its members.

Projects Management

Further, a Projects Management Group has been formed to replace management of ASEE projects by already overburdened officers or by an *ad hoc* committee of some sort. PMG has been charged with the responsibility of reviewing proposals in order to recommend ASEE sponsorship and of participating in the management of approved projects, especially through help in securing financial support and in staffing the project and through periodic reviews of progress. Hopefully, PMG will also provide leadership in research in engineering education by initiating proposals for needed research from within itself. A token grant of $5,000 from the Society made it possible to organize PMG, but so far efforts have been unsuccessful to secure "outside" financing to hire at least a part-time executive secretary and to give it the working capital it needs to become truly effective.

In addition, both junior and liberal-arts colleges with strong pre-engineering curricula are now to be admitted to affiliate membership in the Society. Letters of invitation have been sent to many such institutions, and the response to date has been truly encouraging. We are welcoming these new members of our family at this meeting, and I should hope that all of us do everything we can to make it both a pleasant and a profitable experience for them. But not all the gains were organizational ones.

Grants

Even though the Projects Management Group has so far been unable to obtain financial support for its own operations, it has secured a grant of almost $50,000 from the National Science Foundation to finance the proposed "Evaluation of Technical Institute Education," and there is reason to believe that support might be received from NSF for a somewhat revised study of graduate education in engineering. In addition, a grant of about $25,000 has been received from NSF to extend the Visiting Engineers program for another three years.

Further, the Ford Foundation has granted us another $10,000 to provide a three-year supply of "The Road to Graduate School" and "Teaching Tomorrow's Engineers." These two publications by the Committee for the Development of Engineering Faculty have become "best sellers." More than 1000 individual orders have been received from men in industry for "The Road"!

As I hope all of you know, the work so ably started by Harold Hazen's committee is being continued in a three-pronged attack. ECAC is carrying on with the recruitment part of the work, a new committee under the chairmanship of Ray Bolz is continuing with the development aspects, and the Educational Methods Division is investigating the utilization aspects. This part of the work led to the highly successful Midwinter Invitational Conference on Engineering Faculty Utilization, held in Pittsburgh with the cooperation and support of the Westinghouse Educational Foundation.

I might also mention, in connection with ASEE conferences, that the College-Industry Conference sponsored by the Relations with Industry Division and the University of Cincinnati drew a record-breaking attendance this year, despite some of the worst weather of the season. I speak from personal knowledge. The subject of this Conference was "Professional Climate in Engineering," and the *Proceedings* are available.

Among other things, I might also mention that the first Conference on Engineering Design Education was held this

last year at Case Institute with Ford Foundation support. The work of the Nuclear Committee continues to be very active, with additional summer institutes scheduled for this year. In addition, a $35,000 contract with the AEC has been signed for an extension of study of "Objective Criteria for Nuclear Engineering Education" to be conducted jointly by ASEE and the American Nuclear Society.

I'm sure all of you have noticed—and, I hope, approved—the format and other changes in both the JOURNAL and the *Yearbook*. I think both Leighton Collins and Paul Bryant deserve a lot of credit for streamlining these publications.

ASEE and Congress

To me one of the most significant events of the past year was the fact that —for the first time in its history, to my knowledge—ASEE has managed to get a bill introduced into Congress. This may be an overstatement; but I consider H. R. 4361, a bill introduced by Mr. Van Zandt of my state to amend the National Defense Education Act, to be an ASEE bill. Ken Holderman and I helped write this bill, and we are certain that it represents a distinct "plus" for ASEE. In particular, it recognizes technical-institute training and its critical importance to the nation's defense, to correct what we all know to have been a very serious oversight in the original legislation. As it was finally worded, the bill does not please all of us. In particular, it limits Federal assistance to public institutions, eliminating aid to many deserving technical institutes. But it does give recognition to this type of education, which, in itself, is a tremendous step forward. Since the introduction of the Van Zandt bill, S. 1562 has been introduced into the Senate. This bill also recognizes technical-institute education, along with community colleges generally. However, it not only limits assistance to public community colleges but probably also denies help to branch campuses such as those operated in Kentucky, or in Wisconsin, or in Pennsylvania, and elsewhere.

It would seem, therefore, that the "Assembled Surveyors of *E*nergetic *E*nterprise" would be an appropriate translation of the letters "ASEE."

Not All Good

But not everyone would agree. In fact, if my mail this past year has been any indication, many feel that the "Ancient Society for *E*liminating *E*ngineers" would be a more fitting use of the initial letters of our organization. And when you stop to look at it, you have to admit that these people can make a fairly strong case for themselves.

ASEE, these people insist, has a reputation for timidity and a lack of imagination. They find that it is ineffective, that it lacks vitality, that its stature is unnecessarily low.

We could become angry, quarrel with assessments of this sort, and seek to defend our record. But there would be little wisdom to such a course of action. As engineers and engineering educators, we must surely know that a wiser course of action is to take a long, hard look at our operations; design sound, logical plans to strengthen and improve those operations; and then take whatever steps are necessary to put those plans into effective practice.

What is there in our operations that makes ASEE less effective than it might be? Well, ASEE is a voluntary organization; and, as with any such organization, its vitality is directly related to the amount of time and energy that its members are willing and able to devote to it. I believe most of you will agree with me that ASEE has come to rely increasingly upon a relative handful of "old timers." These are men, by and large, of proved ability and industry. And, perhaps because of this ability and industry, most of them have become administrators with important responsibilities in the institutions and industries for whom they work. Their primary concerns center naturally around their administrative duties. But just as important from the standpoint of the Society, those duties almost totally pre-empt their productive capacities. It

has been noted before that the leisure time we are winning for Americans has largely by-passed the American executive.

In at least one respect, a society is like an electrical circuit. To do the job for which it was designed, a circuit contains many separate elements: conductors, switches, fuses to prevent overloads, perhaps some condensers for storage and some resistors for control, some tubes and some solenoids for converting energy into action, maybe some transformers and inductors, and the like. Malfunctioning of one or another of these parts can cause all sorts of trouble. But still *something* happens. Even a short circuit produces noticeable, even dramatic, results. But remove one of the parts (one of our members, in this case)—send it to Europe, for instance, or take it out and plug it into another circuit employed, perhaps, in the construction of budgets—and nothing happens. The circuit is dead. The work stops. In ASEE there is simply too much down-time for precisely this reason—because vital parts have been removed from the circuit. We just have too many administrators with too many problems in key positions within the Society.

Perhaps we can carry this electrical analogy a little further. An electrical circuit must be specially designed for the job that is required of it. What about ASEE? How adequate is its design? Is it structured in the best possible way for achieving its objectives?

Many of those who have written me in the past year think that it is not. They point to the fact that the Constitution and Bylaws Committee has not met for five years nor, until this year, had the Long-Range Planning Committee. And they invite me to take a look at the Society's Divisional and Sectional structure to see if I don't agree with them that some changes are in order.

And I must admit that they seem to have a point. Does this structure really make sense? We have an Electrical Engineering Division, but a Nuclear Committee. We have a Committee for Metallurgical Engineering, but a Division for Engineering Graphics. And where does the bright young engineer interested in the exciting new areas—especially the inter-disciplinary ones—find a home? The young man, for instance, interested in solid-state electronics—the Physics Division or the Electrical Engineering Division? This problem is becoming more and more acute, with interests being increasingly expressed by our young members in such fields as biomechanics, systems analysis, physical chemistry, and the like. Does ASEE really have divisions that can speak authoritatively in specific technical fields? Does it have divisions that can attract the interests of those working in such important new areas as materials science and energy conversion?

Did the Graduate Studies Division resolution aimed at encouraging the establishment of programs leading to the Master of Engineering and Doctor of Engineering degrees truly represent the majority view of the faculty members interested in graduate education? How about the Young Engineering Teachers Committee? What really is the point of this Committee? And if there is some logic for it, wouldn't the same logic indicate that we should have an "equal and opposite" committee, for instance, for "old" engineering teachers or "mature" engineering teachers?

How much truth is there in the charge that our divisions are, in fact, small, self-perpetuating committees charged chiefly with the responsibility for organizing several sessions of the annual meeting? And, if we should decide to re-organize, should we eliminate the divisional structure, as some suggest? Or should we re-organize along functional lines—that is, with divisions for such areas as fluid mechanics, thermodynamics, energy and raw materials resources, information processing, and the like, as others suggest? If it is true that our present structural organization tends to perpetuate tradition, how can it be re-structured to provide meaningful forums for the discussion of important issues in a rapidly developing, dynamic profession?

Using New Blood

I don't want to run this electrical analogy into the ground, if you will forgive

me a weak pun, but I do want to point out that no electrical circuit is worth anything unless it is connected with an adequate and reliable source of energy. *The most persistent criticism of all is that ASEE has no way of identifying the bright young engineering educators with new and exciting ideas—nor any effective mechanism of encouraging their participation if we could identify them.*

One dean wrote me that "few young faculty members would want to go (to the annual meeting) even if presented with the opportunity." He spoke of the "same old fare served up in the same old way" and insisted that the Society has become fragmented into a lot of special-interest groups in which the same people meet year after year to hear each other discuss the same topics from the same points of view.

This is pretty strong stuff. In fairness, however, I think we must admit there is considerable truth to it. As I have suggested, the divisional meetings here at the annual meeting give our younger members very little opportunity to participate actively. With one annual meeting, one sectional meeting, and one JOURNAL, what chance does a young, energetic engineering teacher have to expose his ideas in order that they might be discussed by his peers or brought to the attention of the "elder statesmen"? Where does he get a chance to demonstrate his abilities and to share his research and teaching experiences?

In fact, I rather think that this charge is pretty largely true of engineering generally. In an anomaly that I have never understood, leadership in engineering—a chronologically young profession that has undertaken as its primary task the use of new knowledge to create new machines, processes, and systems—has passed into the hands of a small group of patriarchs—men with well-deserved reputations but whose creative technical work is behind them. Perhaps we have reason to view with fear and apprehension the work of the wild-eyed young innovators in physics and chemistry, but I wish we had more reason to fear the mavericks among the young engineers. Perhaps we have over-emphasized the word "practical." Perhaps we have tended to make it synonymous with "conservative." Perhaps we have extended "feasible" to mean "traditional."

If this is true, we've *got* to do something about it! Today at any one given point in time, the traditional is obsolete. We are living in what should be for engineers the most exciting period in history. There are big things to be done—important things—necessary things. Society needs engineers and their talents more than it has needed them in any other period in history. The theme of this meeting—"Engineering and World Affiairs"—emphasizes the fact that there is important—even vital—work for engineers in every country of the world. This work will not be done by young engineering graduates oriented in their classes to look no further than a job of designing unnecessary fins for automobiles or a smaller transducer for a radio set with a large American corporation—to think no higher than that needed to conduct a technical holding operation in interior America—to worry about nothing more important than the professional perquisites and status granted them by an ungrateful public.

For this we need young engineers with ideas—we need young engineers with imagination—we need young engineers with vision—we need young engineers with idealism and courage. And we need young engineering teachers who can inspire and encourage these ideas and this imagination, vision, idealism, and courage.

This, as I see it, is our challenge. Are we going to be the "Assembled Surveyors of Energetic Enterprise"? Or are we willing to settle for the "Ancient Society for Eliminating Engineers"?

Assuming that we really want to accept the challenge of the first of these, how do we go about it? What do we do next?

Accepting the Challenge

The first step, as I see it, is to start an immediate revision of the Constitution

and Bylaws. I think it is abundantly clear that these are obsolete instruments for directing our energies and our activities. Perhaps this should start with a sweeping revision of our divisional, sectional, and branch structure, with emphasis upon designing a structure that would provide built-in mechanisms for identifying and putting to work our bright young engineering teachers with ideas. Certainly we need more branches, and we need better organized and more significant branch programs. We need to look again at our sectional structure and at whether one sectional meeting a year is enough to generate the sort of activtiy and enthusiasm we are talking about. Certainly we need to do something about our divisional structure, as we have seen. Here we must do something of the same sort of thing we are, hopefully, learning to do in our courses and curricula—design for change and progress. We must create divisions with real appeal to the needs of our most forceful and imaginative young teachers, yet we must avoid setting up another rigid system that will itself become obsolete even before it is codified. And we need to make possible the publication of short articles on engineering *education*, if not in the pages of the JOURNAL, then in the pages of better, more significant divisional publications.

Further, we must provide for continuity of leadership within the Society. At one time, we tried to keep the election of the President and other officers a secret until they could be announced at the annual meeting. This made for a dramatic inauguration, at least for those who had bothered to speculate; but it failed to provide even a slight measure of continuity to the running of the affairs of the Society. We now provide for a lead time of a few months, but even this amount of time is insufficient. In fact, the president should be selected from the Executive Committee, and he should serve as a vice president or as a "presidential designate" for a full year before taking office. Only in this way can our officers have the sort of preparation that they really need for the job.

Further, I should hope that the Long-Range Planning Committee would become the most active committee within the Society. And I should hope that the projects it undertakes would not be so long range that the conditions generating the planning would have changed before the planning is completed. In fact, I think I have a project for the Committee to start on immediately: the removal of our headquarters to a location from which we can make our counsel and our advice heard by those who shape the policies of our country and our world—perhaps to New York, or, better still, to Washington, D. C.

In addition, we must find adequate support for the Projects Management Group, equip it with a truly dedicated and energetic executive director, who has the time to devote to it, and fashion it into a really effective system to deal with the important study, research, and conference work of the Society on a logical project basis. *Ad hoc* study groups have done important work in the past—witness the Grinter Report, the Hammond Report, and others. But basically these reports reflected a consensus of the best that was thought and known about engineering education. That consensus has now been taken, and we must take the next step—research. This takes time and money and consistent effort—and organization. We must devise a mechanism—a really effective mechanism—for initiating and managing this research.

Finally, I challenge the Annual Meeting Committee to devise a program that no young faculty member can afford to miss. In fact, I want to suggest that, before this 69th annual meeting has adjourned, the Annual Meeting Committee should decide on a theme for the 70th annual meeting and announce that theme publicly in order that each division that intends to hold a session next year can select its sub-theme, announce it to all its members, and call for the submission of papers. Perhaps the time for the submission of these papers could be set for some date in December, so that the officers of the various divisions can have time to

choose the best from among those submitted and still have time to publish the titles in the printed program. Such a system would give the young and perhaps unknown members of the divisions an opportunity to contribute. Certainly they should in all ways be encouraged to do so.

These suggestions are predicated on a few simple convictions. There is important work to be done in the world, and much of it should—must—be done by engineers. To do this work—and to do it properly—engineers must be unwilling to accept their traditionally passive role in the significant operations of society. In fact, they must be willing to accept fully the responsibility of leadership. They must not wait to be asked to provide their services. They must volunteer them. They must actually insist that they be used.

This calls for a kind of courage and imagination and idealism that engineers have not traditionally exhibited. And the leadership for this change must come, it seems to me, from within engineering education. It must come, especially, from the bright, young engineering teachers. And we must, here in ASEE, provide to the fullest extent possible a mechanism through which these young teachers can be recognized and given credit for their work and be encouraged to develop it and expand it. Engineers must come to accept responsibility commensurate with the importance of engineering in our society today. The place to start is here.

And if a start is made here, at this meeting, I shall be sorry that I didn't have the faith of my convictions and refused to let William Shakespeare bully me. I shall be sorry that I built this speech around the phrase "The Ancient Society for Eliminating Engineers" and not around the phrase "So are you all—all honourable men." But, in contrast with Antony, I would have meant it, sincerely and completely.

ADVANCED PLACEMENT PROGRAM AT CASE

Case Institute of Technology has become the second college in the country to state that it will award college credit to high school students on the sole basis of a grade achieved on the Advanced Placement Examinations of the College Entrance Examination Board, Karl B. McEachron, Jr., Dean of Instruction, has announced. The first school in the country to adopt a complete Advanced Placement academic credit program was Harvard.

The Advanced Placement Program, which is part of the College Entrance Examination Board, encourages the establishment of college-level courses in high schools and provides assistance and course outlines in more than a dozen science and liberal arts subjects.

During the past seven years, the number of high schools participating in the Advanced Placement Program has grown from 18 in 1953 to 890 in 1960, and the number of students taking the examinations has increased from 532 to 10,531. This phenomenal growth rate is also apparent in the number of participating colleges. In 1953, 94 colleges considered students for advanced placement, a figure which jumped to 567 last year. Advanced placement participation is offered in 46 Ohio high schools, including 11 in the Cleveland area.

Under the new policy adopted by the Case faculty for Advanced Placement, a student enrolled in such a program in high school can take an examination prepared by the CEEB which may determine his college standing in certain courses.

Upon application, Case will grant a full year's credit in several freshman subjects to students who demonstrate proficiency by receiving an acceptable score on the examinations. Credit will be given for first year Chemistry, Composition, Mathematics and Physics provided the potential student has achieved a creditable score.

Prepare Ye the Way

Comments on the ASEE Annual Meeting in Lexington

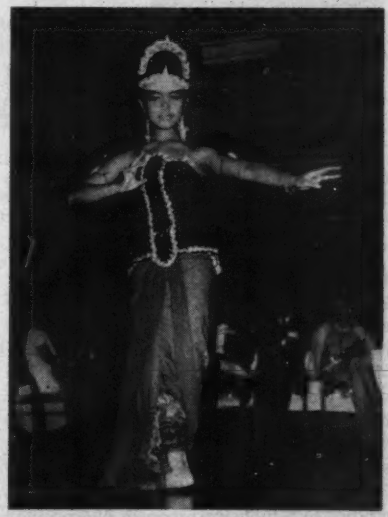
Still in the curricular wilderness of 1961, voices continue to cry out, saying as they have for years that these are perilous, rapidly changing times in which we must educate more and better engineers to handle tasks and responsibilities that we today cannot even imagine. The leaders, the "prophets," continue to challenge engineering educators to meet the demands of a hypersonic world.

The challenge had a deeper tone this year, the wilderness had a wider range, as the Annual Meeting gave heed to its 1961 theme of international relations in engineering education. Dr. Myer Cohen, director of operations for the United Nations Special Fund, placed engineering and engineering educators squarely in the center of our leading international problems. In what he called the revolution of rising expectations, Dr. Cohen accented the need for engineers and for engineering teachers as a vital element in the progress of underdeveloped countries.

The job of assisting new nations takes more than just an engineer with excellent training, Dr. Cohen said. "It also involves training, adapting, and inspiring. It requires, not only a knowledge of psychology and anthropology, but also an intuitive ability to appreciate the folkways and mores of persons who have a totally different outlook on life, and daily habits quite different from our own." He pointed out that the problems of teaching in America are magnified in foreign countries by differences in culture and psychological factors. Psychological and cultural understanding and adaptable personalities are indispensable attributes of engineers being sent to foreign countries.

Clearing the Path

In answer to the challenge, and in response to the prophets in the wilderness, engineering educators reported on genuine progress in engineering education. For example, Professor Otis E. Lancaster of the Pennsylvania State University, told of experiments showing that selected instructors, known to be excellent teachers, attained greater success in teaching large



A moment of pleasant surprise was registered by those who attended the ASEE Annual Banquet when the daughter of Doedi Soemawibjaja, Cultural and Educational Attache for the Indonesian Embassy, Washington, D.C., graciously presented dances native to her country. Also included in this special extra event at the Banquet was the dancing of other Indonesian students that are now attending the University of Kentucky.

The ASEE 1961 Annual Meeting at Lexington, Ky. provided interest and relaxation for many foreign visitors. Enjoying the barbecue at Keeneland race course, a Wednesday evening event, are: (L to R) Koki F. Fukushima from Tohoku University, Japan; Mrs. Fukushima; and Morris Asimow, Professor at the University of California, Los Angeles.

classes of students than an average teacher with a small class. The selected excellent teachers also did better teaching large numbers of students via television than the average teacher with a small class, though those enrolled in the television instruction did not succeed as well as those working directly under the selected teacher.

Professor Lancaster also described studies in which freshmen in engineering were randomly divided into three groups to study the comparative effectiveness of instruction in analytic geometry by television, in large classes of at least 100 students, and in the conventional classes of from 25 to 33 students each. Instructors for the television and in the large classes were carefully selected for their ability to teach collegiate mathematics, but the small classes were taught by a group of teachers ranging from experienced professors to beginning instructors. Over a two-year period, students in the large classes scored significantly higher on a standard final examination (73) than did the students in either the television (69) or the small classes (67). Separate data showed that students in the television classes spent six per cent more time studying than did the students in the large classes and three per cent more than the students in the small classes. Retention and motivation were less developed through television.

Dr. Winslow R. Hatch of the U. S. Office of Education, citing research at the

University of Michigan, confirmed these findings.

To "pioneer advances in the art and science of education for which the entire academic world has long thirsted," a new Center for the Study of Engineering Education within ASEE was proposed by Professor Harold A. Foecke of Notre Dame. Professor Foecke outlined a four-point program to extend ASEE's activities in engineering teaching: 1. a continuous program of publications to report on new teaching developments; 2. development of a catalog and register of available teaching aids, including films, models, slides, recordings, and projection and television equipment; 3. systematic reporting of current research on teaching, including the sponsorship of experiments on the effectiveness of different learning situations; and 4. a program of research on the applicability of operations research techniques to the analysis of engineering education.

New Fields and Projects

Part of the challenge for the future is meeting the needs of new areas of engineering knowledge. A report of a joint study by ASEE and the American Nuclear Society was one step in this direction at the Annual Meeting. The report, which was sponsored by the AEC, concluded that nuclear engineers must have advanced training. The study, which extended over a year, was made to formulate criteria for adequate education in the

College and University presidents also find interesting events to talk over at ASEE Annual Meetings. Pictured here are three Presidents engaged in conversation at the Annual Banquet held at the Phoenix Hotel, Lexington, Ky. (L to R) I. E. Lunger, Banquet Speaker and President of Transylvania College; Frank Dickey, President of the University of Kentucky and ASEE's host this year; and Eric A. Walker, President of ASEE, 1960-61, and President of The Pennsylvania State University.

field of nuclear engineering and to indicate the goals toward which the training of nuclear engineers should be directed.

"Nuclear engineering constitutes a broad and complex field," the report said. "Hence it is only under unusual circumstances that programs leading to baccalaureate degrees in nuclear engineering can provide both the breadth and depth of education that are required to merit the special designation. Consequently, the primary responsibility for the formal and specialized education of professional nuclear engineers lies at the graduate level." However, the committee said, there is need for all undergraduate programs in engineering and science to be broadened to make all college graduates in engineering aware of the potentialities and hazards of nuclear energy. Copies of this first report are available from ASEE Headquarters for 25 cents. AEC has granted additional funds for another year of study and the development of a second report outlining the scope, content, and degrees of understanding necessary in the various areas of nuclear engineering. Dr. Glenn Murphy of Iowa State University at Ames, is chairman of the study committee.

In another study, the National Science Foundation has granted $47,250 to ASEE for a critical evaluation of two-year technical training programs in American technical institutes. The study will be made at the request of Engineers' Council for Professional Development. Its objective is a profession-wide effort to improve technical education in technical institutes by conducting a study of the present role of technical education and its relation to engineering education, as a basis for developing educational and accrediting standards. ASEE's program for an evaluation of technical institute education was prepared by a committee under Dr. Cecil C. Tyrrell, president of Broome Technical Community College in Binghamton, New York.

Other Support for Engineering Education

The National Science Foundation has also granted ASEE $24,000 to provide continued support for the visiting engineer program. This grant was announced at the Annual Meeting.

Under the program, prominent engineers and engineering educators make two-day visits to junior colleges, colleges, and universities to report on new developments in the engineering sciences and to encourage outstanding students to consider engineering careers. By speaking to larger audiences, the visiting engineers are also able to extend to many college students who will not specialize in engineering, concepts about technology and its relationships to modern science. The program is administered by Professor J. W. Seyler, Assistant Secretary of ASEE, at the University of Illinois in Urbana.

This was the best attended and one of the best organized Annual Meetings in ASEE's 68-year history. Official registration reached 3,010 persons by noon on Friday of the meeting. Of this total, 2,622 were visitors to the University of Kentucky from more than 400 colleges, universities, institutes, companies, and organizations. Approximately 400 University of Kentucky personnel attended the meeting. Registration figures showed attendance by 1,901 men, 625 women, and 484 children.

Next up: Air Force Academy, Colorado, June 18-22, 1962. See you there!

WEIL DEAN AT MANHATTAN

Professor Robert T. Weil has been appointed Dean of Engineering at Manhattan College. Dean Weil, head of the Department of Electrical Engineering since 1945, succeeds Brother Amandus Leo, F.S.C., who is retiring as Dean of Engineering after 31 years.

What's Going On in ASEE

A Narration of Major Actions of the Executive Board and General Council at their June Meetings.

W. LEIGHTON COLLINS

Secretary, ASEE

Things really hummed during the meetings at the University of Kentucky, particularly in regard to the report of the Long Range Planning Committee and the recommendations of the Executive Board for the establishment of a Technical Institute Council and a new dues structure for Institutional Members. The suggested reorganization is printed in full starting on page 39. It does away with the overlapping authority of the Executive Board and General Council; eliminates the confusion relative to Division and Section officers reporting to Vice-Presidents, and the Vice-Presidents in turn sitting on a par with Division and Section representatives on the General Council; abolishes the General Council, because with 52 members it is too large to serve as a deliberative body and with two meetings a year cannot act with the promptness and precision now required by the varied activities of the Society.

The reorganization plan was enthusiastically endorsed by the Executive Board, and was transmitted to the General Council with the recommendation that it take no action until its November meeting. In this way, all have ample opportunity to study it and to discuss it with others.

The Constitution and Bylaws Committee submitted the changes to the General Council required to establish the Technical Institute Council, to have the representatives of Industrial and Associate Members become individual members with all rights and privileges, to increase the dues of all Institutional Members, and several other changes of lesser importance. All were approved by the General Council and all were referred to ECAC and ECRC for appropriate action. If all goes well, these and the changes required for the reorganization will be submitted to the individual members for letter ballot approval early in the spring of 1962 so that functioning under the new provisions can begin on July 1, 1962. The Constitution and Bylaws Committee also has been instructed to critically examine all sections of the present constitution and bylaws to be certain all provisions are straightforward and capable of legal interpretation.

W. L. Everitt of the University of Illinois is the new chairman of the Long Range Planning Committee. He will appreciate suggestions and ideas regarding further reorganization. The Committee is instructed to continue its work—including a consideration of Sections and Divisions.

The General Council approved the increase of dues of individual members 36 years of age and over from $9.00 to $10.00 per year, effective July 1, 1961. This was necessary to meet the increased costs of operations and improved services to all categories of members. The budget of $159,160, which was approved, could be balanced only by increasing these dues, by including salary and indirect cost recoveries as income (for the first time), and by eliminating the usual allocation of $5,000 for the emergency reserve. Increases due to normal growth of membership were allowed for, but

based on last year's decline in advertising the estimated income from that source had to be decreased. Increased allocations were provided for Division and committee activities, travel for the fall meeting of the General Council, salaries, additional office equipment, and the employment of the Assistant Secretary on a calendar rather than an academic year.

The time devoted to the editing of the JOURNAL OF ENGINEERING EDUCATION by P. T. Bryant was reduced from one-half to one-quarter, in compliance with a request from the College of Engineering of the University of Illinois. The production and advertising aspects will be taken over by others in the headquarters staff.

Membership

The number of new individual members for the year is 1,029, and the membership of the Society reached 10,000 for the first time in its history. It is significant to note that slightly more than half of the new members were under 36 years of age. The sensitivity of Industrial Membership to the general economic condition of the country is indicated by the 20 resignations, as compared to three for each of the past two years. Fortunately, the activities of the Industrial Membership Committee resulted in the same number of new members!

At the end of the year, 248 individual members were dropped from membership because they had not paid dues for two years. Resignations totalled 239, the largest number in the past five years. Life membership was granted to 24, bringing the total for the year to 33 and the grand total to 300. "Addresses unknown" claimed 36.

The plans for promoting membership next year will be the same as for this year, but it is hoped all efforts will be better coordinated and get under way early in the school year. Discussions indicated that there were no reasons why Individual, Industrial, and Affiliate memberships should not continue to grow. A thousand new individual members per year must be considered a minimum achievement.

The question of establishing a new category of "Sustaining Member" for industries wishing to contribute $300 or $500 per year or more was referred to RWI for recommendation.

Communications

One of the rather unexpected outcomes of the meetings was the repeated ways that the need for improved communications came to the fore. The JOURNAL OF ENGINEERING EDUCATION, of course, is the primary contact between the Society and its members. In his annual report, Editor P. T. Bryant stressed the importance of the JOURNAL as the medium of communication for engineering teachers, and identified the primary mission of the JOURNAL as being effective communication. Details of papers received, their disposition, etc., are given in the Editor's report on page 42. Suffice it to say here that 336 manuscripts were received and 98 were published, of which 28 were from the Annual Meeting at Purdue. The Editorial Committee, made up of a representative from each Division and Council and some committees, has served well in aiding the Editor in making selections. The amount of advertising decreased during the year, but the income proved to be almost the same as for last year, about $30,500.

A general plan for the coordination and identification of all ASEE publications was approved by the Executive Board, and the Secretary and Editor are to implement its provisions. This includes all types of Divisional publications as well as those of the Society, including the JOURNAL OF ENGINEERING EDUCATION.

The reports of the various Vice-Presidents indicated a general need for improving the communication and coordination of effort between the various units of the Society and Society headquarters, and with developments on the national scene directly involving engineering education. Though this reflects on current functioning, it also indicates a recognition of the need to reorganize and of the necessity for added services that only

ASEE can provide, as well as a willingness of the membership to want to do something about the deficiencies. The general need for improved services and the development of the greatest ability of the Society to serve its members represents much of the thinking back of the suggestion of President Eric A. Walker that Society headquarters must be moved to Washington, D. C., onto the spot "where the money is and where the rules are made." No one now in Washington speaks for engineering education or fights for it. A partial solution of the problem was the decision that the Vice-Presidents for Sections, instead of the "nearest officer," attend all Section meetings.

Young Teachers

A discussion of the continuation of the Committee of Young Engineering Teachers again occupied much time. It was recognized that some young men do find the Committee to be a good stepping stone to active participation in Society affairs, but that nowhere was there any real enthusiasm for segregating and labeling the young men. It was agreed that the Sections must give the young men an opportunity to participate, as well as undertaking activities and programs appealing to the new engineering teacher. RWI also is interested in developing local and regional activities because of its program of establishing local groups. And, lastly, there is no doubt but that ECAC should and must have a continuing interest in the development of new teachers.

Three of the four Summer Schools approved continue long-standing customs of Divisions to study in depth new developments in the teaching of their subject matter every five to eight years, and the fourth might be establishing a new pattern. Those approved are:

1. *Chemical Engineering*—August 20-25, 1962, University of Colorado. A grant for $30,128 is to be requested of NSF. Fifth meeting.
2. *Mechanics*—The Program Management Group approved a Summer School for *mechanics teachers* to be held at Ohio State University in September of 1962. Ohio State is to request a grant from NSF. Fourth meeting.
3. *Engineering Graphics*—1962, in connection with the Annual Meeting of the Air Force Academy. Self-supporting. Sixth meeting.
4. *Civil Engineering*—The National Conference of Teachers of Surveying—August, 1962, Atlanta, Georgia. A grant for funds might be necessary. Second meeting.

ASEE Projects

The report of the Committee on Objective Criteria in Nuclear Engineering Education was distributed. It also was announced that the Atomic Energy Commission had amended the contract to continue the study for another year, providing an additional $34,170. Dr. Glenn Murphy of Iowa State continues as director of the jointly sponsored ASEE-ANS project. This, plus the $47,250 from NSF for the "Evaluation of Technical Institute Education," the $48,000 from NSF to continue the "Visiting Engineer" program for two years, and the $10,500 from the Ford Foundation to reprint and distribute "The Road to Graduate School" and "Teaching Tomorrow's Engineers" brings to about $140,000 the amount of money ASEE has received recently for special studies.

The proposed Graduate Study project has been revised and is awaiting the tentative selection of a director and working committee prior to resubmission to NSF. The financing of the Projects Management Group is still in the hands of NSF; no action probably will be taken on it until after the NSF has its summer meeting in Denver to identify the problems in engineering education. On the recommendation of PMG, its name is being changed to Projects Committee; B. R. Teare, Jr. of Carnegie Tech is the new Chairman.

The Summer Institute on Effective Teaching now becomes a co-sponsored project of Penn State and ASEE. For future institutes an advisory committee will

be appointed and the request for funds will be submitted jointly by Penn State and ASEE.

The Canons of Ethics of ECPD were reaffirmed as being the foundation for guiding principles for the establishment of codes of ethics or rules for professional conduct by individual societies. This action and the approval of an appropriate "scope of project" authorizes ECPD's Committee on Ethics to proceed with its study of the Canons and codes of ethics, making certain all are in keeping with the times.

The International Engineering Education Committee submitted a statement on "Problems of Education and Work Experience in the United States for Engineering Students from the Developing Countries," and the General Council voted that it be distributed to deans of engineering and to fifteen governmental agencies, foundations, pertinent international groups, etc.

"Interdisciplinary Challenges in Engineering Education" was adopted as the theme for the 1962 Annual Meeting at the Air Force Academy, June 18-22. It was further agreed that attempts be made to extend a broader "invitation for papers" for all portions of the Annual Meeting program.

Future meetings are:

Executive Board—October 3 and 4, 1961, starting with a 6:00 P.M. dinner meeting; Louisville, Kentucky.

November 16 and 17, 1961, starting with a 6:00 P.M. dinner meeting; Kansas City, Mo., Hotel Muehleboch.

February 8 and 9, 1962, Chicago, Ill.

April 5 and 6, 1962, Chicago, Ill.

June 17 and 20, 1962, Air Force Academy, Colo.

General Council—November 16, 1961; 12:00 o'clock noon, Kansas City, Missouri, Hotel Muehleboch.

June 18 and 20, 1962, Air Force Academy, Colo.

Summary

The actions and discussions lead to the conclusion that ASEE is at a real crossroads. There is ferment; members want to do things, want the Society to do things, and seem to be willing to organize to get things done; there is both a request for leadership and a willingness to provide it; there is a demand for more information about what is going on in order to be up-to-the-minute; there is a recognition of importance on a level not previously recognized; there is a plea for improved communications at all levels. The job now is to see that this ferment, this interest, this desire for action leads to positive steps for progress in engineering education. Membership—dues—activities—services—headquarters—they form a circle. Headquarters provides the continuity factor, must do the coordinating, and must give the service; staff is required to do the jobs, and staff requires dues and members. It looks as though the members will rise to meet the challenge, today's challenge to engineering education.

ALEXANDER PRESIDENT OF WEBB

Dr. William T. Alexander, Dean of the College of Engineering at Northeastern University, has been named President of the Webb Institute of Naval Architecture, Glen Cove, Long Island, New York, according to an announcement by the Webb trustees. The appointment was effective September 1.

As President, Dr. Alexander heads one of the nation's leading institutions of higher learning devoted to the field of naval architecture. Webb Institute offers B.S. and M.S. degrees and has enrollment of approximately 75 students who must meet very high entrance requirements. All students receive full tuition scholarships and have board and lodging expenses paid.

Citations for Honorary Membership

Honorary members of the American Society for Engineering Education are chosen "from among those who have rendered eminent service to mankind in engineering education or other engineering fields." Election is by favorable vote of at least three fourths of the General Council. No more than two can be elected in a given year. Previous to 1961, only six had been elected to honorary membership.

VANNEVAR BUSH

Distinguished administrator, outstanding electrical engineer, stimulating teacher and inventor, you have served well the field of engineering education as professor, dean, vice president and trustee of numerous colleges. At present, you are a director of major industrial concerns. You have a life membership in the Corporation of Massachusetts Institute of Technology.

You have served as President of the Carnegie Institute and Regent of the Smithsonian Institution. You have been Director of the Office of Scientific Research and Development, and have served as advisor to the Joint Chiefs of Staff of the United States.

You are a member of many professional and technical societies and have the rank of fellow in some. You are a noted author. Perhaps your most memorable contribution as an engineer was the development of the differential analyzer which gave great impetus to the present enormous field of rapid computation. You are a man with a sound, clear mind, a careful investigator, a creative thinker, a leader of men, and a warm human being.

It is in recognition of your many contributions to creative engineering, scientific administration and engineering education that the American Society for Engineering Education has elected you an Honorary Member.

S. C. HOLLISTER

Educated as a civil engineer, you have had a distinguished career in industry and as a consultant to industry. Since returning to Purdue University where you served well for many years, you have spent most of your time with colleges. Your final college affiliation has been with Cornell University where you went in 1934 as Director of the School of Civil Engineering. Since then, you have climbed the administrative ladder, becoming successively, Associate Dean of Engineering and Dean of Engineering, in which capacity you served for 22 important years. Since becoming Professor Emeritus in 1959, you have continued as a consultant on many important projects for industry and for the Federal Government.

You have been active in the Engineers' Council for Professional Development, the Engineers Joint Council, the Office of Defense Mobilization, and the Signal Corps Research and Development Advisory Council.

Because of your outstanding achievements, you have been made an Honorary Member not only of the American Society of Civil Engineers but the American Society of Mechanical Engineers, and you are a member of many other technical societies. You are an author of note.

Perhaps your principal contribution is the building of a first-rate engineering college at Cornell University. Along with this, you have given of your talents to engineering education in general, and you have served as a President of the American Society for Engineering Education.

Because of your many contributions to the profession of engineering, the American Society for Engineering Education has elected you an Honorary Member.

THE LAMME AWARD

The Lamme Award consists of a gold medal and bronze replica bestowed annually upon a distinguished engineering educator for excellence in teaching and contributions to the art of teaching; contributions to research and technical literature; achievements which contribute to the advancement of the profession; and engineering administration. The Lamme trust fund was established in memory of Benjamin Garver Lamme.

OLAF ANDREAS HOUGEN, Burgess Professor of Chemical Engineering at the University of Wisconsin, was born in Manitowoc, Wisconsin, on October 4, 1893. In 1915 he received the Bachelor of Science degree in chemical engineering from the University of Washington. His graduate training in chemical engineering was taken at the University of Wisconsin, from which he received the Ch.E. degree in 1918, and the Ph.D. degree in 1925.

His teaching career covers a period of over forty years, most of it at the University of Wisconsin, but also including appointments at the Illinois Institute of Technology, the University of California at Los Angeles, the Norwegian Institute of Technology, and Kyoto University of Japan. His work as a teacher began in 1917, when he was appointed to an instructorship. This was soon interrupted by a call to military service in World War I. Professor Hougen's service to the University of Wisconsin included three periods as Chairman of the Department of Chemical Engineering, a position which he relinquished in 1955 to accept the Burgess Professorship.

Professor Hougen joined ASEE in 1930, and was active in the organization of the Chemical Engineering Division, serving as its chairman in 1935-36. Some of his papers on chemical engineering education have appeared in the JOURNAL OF ENGINEERING EDUCATION.

Students and colleagues have long recognized Professor Hougen as a stimulating and effective teacher. He has guided over forty students to their Ph.D. degrees in chemical engineering. In all aspects of his educational work, he has required the highest level of performance, yet has been a sympathetic and inspirational counselor. Students who have come under Professor Hougen's influence have risen to high positions in the chemical industry and in the academic world. In recognition of his outstanding accomplishments as a teacher, he was selected to be the first recipient of the Benjamin Smith Reynolds Award for Excellence in Teaching Future Engineers, established by an alumnus of the University of Wisconsin.

Through his ability to apply the basic principles of physics and chemistry to the solution of engineering problems, he has been a major influence in bringing about the transition from the industrial chemistry approach in chemical engineering education to the present-day approach based on the engineering sciences. His imaginative insight into the problems confronting the chemical engineer led him to develop new principles and approaches to the teaching and application of material and energy balances, thermo-

To OLAF ANDREAS HOUGEN, *for his pioneering and continuing contributions to the development of a scientific foundation for the practice of chemical engineering, for the inspiration and vision he has given to many students, for his many original contributions to the technical literature, for his service in bringing to foreign countries the story of chemical engineering as practiced and taught in the United States, for his high standards of personal and professional conduct, and for his sympathetic understanding of his students and colleagues, we present this thirty-fourth Lamme Award.*

dynamics, heat and mass transfer, and chemical engineering reaction kinetics, all of which are foundation stones of modern chemical engineering. His textbooks on these subjects, co-authored with Dr. K. M. Watson, have been widely used not only in this country, but also abroad, and they have been translated into several foreign languages. Textbooks have been only a part of Professor Hougen's contribution to the literature of chemical engineering. He has been author or co-author of over ninety papers and bulletins on chemical engineering research and education.

Professor Hougen has gained an international reputation as a leader in the field of chemical engineering education. He has served as Fulbright Lecturer at the Norwegian Institute of Technology and at Kyoto University of Japan. In addition, he has given lectures in Germany, India, Mexico, and Taiwan, chiefly on the system of chemical engineering education followed in this country, and its evolution.

Olaf Hougen's extensive and continuing contributions to the development of chemical engineering have been recognized through many honors. For his outstanding contributions to the literature, he received the Walker Award of the American Institute of Chemical Engineers in 1944. In 1958 the same society honored him with a Founder's Award, one of five given when this award was established for outstanding and continued contributions to the development of chemical engineering in the fifty years since the founding of the Institute. Other honors have included honorary membership in the Indian Institute of Chemical Engineers, an honorary Doctor of Science Degree from the Norwegian Institute of Technology received in 1960, and the 1961 American Chemical Society Award in Industrial and Engineering Chemistry.

1928—George F. Swain
1929—Irving P. Church
1930—Charles F. Scott
1931—Dugald C. Jackson
1932—Arthur N. Talbot
1933—Dexter S. Kimball
1934—Edward R. Maurer
1935—William E. Wickenden
1936—Herman Schneider
1937—Frederick E. Turneaure
1938—Robert L. Sackett
1939—Stephen P. Timoshenko
1940—Audrey A. Potter
1941—Anson Marston
1942—Roy A. Seaton
1943—Thomas E. French
1944—Hardy Cross
1945—Harry P. Hammond
1946—Robert E. Doherty
1947—Warren K. Lewis
1948—Alexander G. Christie
1949—Karl T. Compton
1950—Fred B. Seely
1951—Allan R. Cullimore
1952—Solomon C. Hollister
1953—Harry S. Rogers
1954—Thorndike Saville
1955—Vannevar Bush
1956—Llewellyn M. K. Boelter
1957—William L. Everitt
1958—Linton E. Grinter
1959—Gordon S. Brown
1960—Theodore von Karman

THE GEORGE WESTINGHOUSE AWARD

The George Westinghouse Award was established by the Westinghouse Educational Foundation in 1946 as an annual award to young engineering teachers of outstanding ability to recognize and encourage their contributions to the improvement of teaching methods for engineering students. The award consists of $1,000 in cash and an appropriately engraved certificate.

DAVID CALVIN WHITE has contributed to the enhancement of engineering and engineering education through his great intellectual curiosity, his constant dissatisfaction with current state of the art, his unwillingness to compromise on character and performance, his loyalty to students and colleagues, and his rare talent for thinking in ways that transcend traditional patterns.

Born on February 18, 1922, in Sunnyside, Washington, he attended secondary schools and junior college in Portland. Following an interruption by World War II to work in West Coast shipyards, he attended Stanford University, where he received his B.S. in 1946, his M.S. in 1947, and his Ph.D. in 1949.

Dr. White's academic life has consistently blended teaching with research. While a graduate student, he held a research fellowship and a teaching assistantship. At the University of Florida, he taught both undergraduate and graduate courses while conducting research on a wide range of topics. During this period he became convinced that the teaching of electrical machinery and power subjects lacked the broad foundation and vitality that would give students the versatility and adaptability for contributing imaginatively to this important field.

In 1952, he joined the faculty of M.I.T., where he led a program of research and teaching in the fundamental foundations of electrical machine theory. He evolved the theme of energy processing as a broad, viable concept; he revised laboratory teaching around the concepts of electromagnetic theory, analytical machines, and the interaction of fields and matter. He re-established graduate study and faculty research in energy processing at the systems level. He broke with tradition. Courses on electric power modulation, control and conversion of energy, and fields, materials and components replaced conventional subjects on AC and DC machines. Old machines were replaced by a manifestation of Kron's generalized machine which gave physical reality and unity to the basic theory and permitted the study of both dynamic and steady-state properties.

The text entitled *Electromechanical Energy Conversion*, co-authored by Dr. White and his former student, Professor H. Woodson, presents principles and methods that had no undergraduate prototype. Internationally recognized, it has

To DAVID CALVIN WHITE, *for his inspiring guidance in the thinking and outlook of students; for his creative teaching of a new and broadened approach to the field of electric energy conversion at both the graduate and undergraduate level; for his notable work in developing the generalized machine; for his untiring efforts to help colleagues in sister institutions modernize and revitalize their curricula; for his original and profound textbook; for his vision and leadership in research, we present this sixteenth George Westinghouse Award.*

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been adopted by 18 colleges. Teachers considered the generalized machine to be such a distinct aid to laboratory teaching that in 1958 the Westinghouse Educational Foundation agreed to finance a program to make it widely available. With the advice of Dr. White, Westinghouse engineers designed a unit for manufacture and the Educational Foundation gave one to each of 150 schools of engineering.

Envisioning the potentialities in the broad field of energy processing, Dr. White next embarked on research that today embraces such domains as thermoelectricity, thermionic conversion, magnetohydrodynamics, and fuel cells. His leadership has brought together a team of students and professors from diverse disciplines. He continually seeks new frontiers. He inspires and motivates others to the limits of their abilities. Out of the knowledge generated in these new research programs, he has prompted new interdisciplinary courses in both the classroom and the laboratory at the undergraduate and graduate levels.

Dr. White is unstinting in his help to sister institutions and in counseling colleagues who visit his laboratory. He has published widely. In January, 1961, he gave a series of invited lectures in London to professors from England and the Continent on the results of his work.

1946—James N. Goodier
1947—B. Richard Teare, Jr.
1948—Hunter Rouse
1949—Joseph Marin
1950—Rolf Eliassen
1951—Glenn Murphy
1952—Gordon S. Brown
1953—Edward F. Obert
1954—Thomas J. Higgins
1955—Robert R. White
1956—Milton C. Shaw
1957—Robert E. Treybal
1958—Willis W. Harman
1959—Max S. Peters
1960—R. Byron Bird

THE VINCENT BENDIX AWARD

The Vincent Bendix Research Award consists of a gold medal and citation conferred annually for outstanding research contributions, either in original thought or administrative leadership, to a staff member of the colleges of engineering in the United States. The award was established through the efforts of the Engineering College Research Council and the Bendix Aviation Corporation. The latter granted funds to establish the award in 1956.

NATHAN MORTIMORE NEWMARK has earned world-wide recognition for his achievements in mechanics, structural analysis and design, structural dynamics, and related fields. His unceasing devotion to research, his noteworthy contributions to the betterment of structural design practices, and his leadership in engineering education demonstrate his wide range of interest and endeavor. His penetrating insight, his keen engineering judgment, and his genuine interest in people have been a constant source of inspiration to all who have had the privilege of working with him.

Dr. Newmark was born in Plainfield, New Jersey, in 1910. Following gradution from Rutgers University, with high honors and special honors in civil engineering, he entered the University of Illinois in 1930 as a research graduate assistant. Within the year his first publication appeared in the form of a technical memorandum for the United States Bureau of Reclamation on the subject of abutment movements in arch dams. Since receiving his Ph.D. from the University of Illinois in 1934, his list of publications has grown to over 100. He has been at the forefront in research in many fields in structural mechanics; notably shock, vibration, blast and earthquake effects on structures, wave action, fatigue and brittle fracture, and numerical methods of analysis.

He has been engaged in research and instruction in mechanics and in structural engineering during his entire career. He has been in charge of the structural research laboratory at the University of Illinois since 1946, and it is largely through his leadership that this facility has attained international recognition as a center of research in structural engineering. His capacity for leadership was acknowledged again in 1956 when he was appointed head of the Department of Civil Engineering.

During World War II, Dr. Newmark was a consultant to the National Defense Research Committee and the Office of Field Service of the Office of Scientific Research and Development. He was awarded the President's Certificate of Merit in 1948. From 1945 to 1949, he was a member of the Scientific Advisory Board of the U. S. Air Force, and during 1957 he was a member of a committee of this Board concerned with the problems of protective construction. During the

To NATHAN MORTIMORE NEWARK, *distinguished engineer, scientist, teacher, consultant, and administrator, for his outstanding contributions in research, for his breadth of vision in engineering education, for his dedicated teaching, for his leadership in developing a great research facility in structural engineering and mechanics, for his service to national security, and for his gift of stimulating and guiding the creative efforts of students and fellow workers, we present this sixth Vincent Bendix Award.*

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summer and fall of 1957 he was a member of the Security Resources Panel, better known as the "Gaither Committee," which prepared a report for the President on the problem of protection against nuclear weapons. He has been a member of consulting boards and panels for many groups, including the office of the Chief of Engineers, the Air Force Special Weapons Center, the Defense Atomic Support Agency, the Air Force Ballistic Missiles Division, and the Office of Civil and Defense Mobilization. He has been associated with nearly all the atomic field test programs dealing with effects on structures.

Dr. Newmark's eminence in his field has been recognized by many professional societies and organizations. He has received four awards from the American Society of Civil Engineers alone, the most recent being the Society's highest award, the Norman Medal. His role as consultant on aseismic design of the Latino-Americana Tower in Mexico City —the only multi-story building to resist successfully the major earthquake in 1947—was recognized publicly by the American Institute of Steel Construction in 1958. In 1955 Rutgers University awarded him the honorary degree of Doctor of Science.

Nathan and Anne Newmark have three children: Richard, who graduates from Harvard this June; Linda, a sophomore at Wellesley; and Susan, a sophomore in University High School.

1956—Clifford S. Furnas
1957—Theodore von Kármán
1958—Hunter Rouse
1959—Robert F. Mehl
1960—Maurice J. Zucrow

THE CURTIS W. McGRAW AWARD

The Curtis W. McGraw Research Award was established to recognize outstanding early achievements by engineering college research workers and to encourage the continuance of such productivity in the future. The award was sponsored by the Engineering College Research Council with the assistance of the McGraw-Hill Book Company. The award consists of $1,000 in cash and an appropriately engraved certificate.

WILLIAM ARTHUR NASH was born in Chicago, Illinois, September 15, 1922.

As a scholarship student, he received the B.S. degree in civil engineering in 1944 from the Illinois Institute of Technology. Subsequently, he earned the M.S. degree at that institution and the Ph.D. at the University of Michigan in 1949.

Starting his teaching career in 1946, Dr. Nash instructed in mechanics at the Illinois Institute. While studying for the Ph.D., he taught at the University of Michigan, and in 1949 he became Assistant Professor at the University of Notre Dame, where he engaged in combined teaching and research. In the following year he joined the staff of the David Taylor Model Basin, Navy Department, in Washington, D. C., as head of the Plates and Shells Section. During this time he also lectured frequently at the University of Maryland and the George Washington University. In 1954 he became Professor of Engineering Mechanics at the University of Florida and is presently Head of Advanced Mechanics Research in that department, supervising research and graduate work.

Dr. Nash's professional interests have been mainly in the fields of linear, elastic structures; thin-shell structures; and shallow shells—those shell-like structures in which the altitude is small compared to the lateral dimensions. He has developed new analytical methods for describing shock intensities in linear, elastic structures subject to multi-applied impact loadings, and in this connection he has directed the design and building of an analog simulator system. He has extended the nonlinear large deformation analyses of thin-shell structures to account for the buckling loads exhibited by thin cylindrical shells subject to either external hydrostatic pressure or torsion. In each case, Dr. Nash has done theoretical work alone and has supervised the experimental work that verified his analyses.

Through studies sponsored by the National Science Foundation, Dr. Nash, while at the University of Florida, developed new theories to predict stresses and deflections in shallow shells, and new

To WILLIAM ARTHUR NASH, *for his original research and contributions to the literature in the field of solid mechanics, particularly for developing new and unique analytical methods, including the description of intensities in elastic structures, analysis of nonlinear large deformation of thin-shell structures, and for development of new theories to predict stresses and deflections in shallow shells; and further, for his intense interest in graduate students and graduate education, as evidenced by his leading part in developing a Ph.D. program in engineering mechanics, we present the fifth Curtis W. McGraw Research Award.*

non-linear theories to predict the behavior of ellipsoidal shells. Many of Dr. Nash's achievements have been introduced into the graduate program, in which he is vitally interested.

The publications of Dr. Nash in the field of buckling plates and shells have attracted international attention, and references to his work have appeared in the technical literature of many countries, particularly Russia. In 1958, under an exchange program sponsored by the United States and the Russian Academies of Sciences, Dr. Nash visited mechanics research centers in Moscow, Leningrad, Kiev and Tblisi. Upon his return, he coauthored two papers: "Notes on Soviet Research and Education in Engineering" and "The Mechanics Curriculum at Moscow State University." In the summer of 1960 he served as a scientific consultant to several aeronautical research laboratories in West Germany, under the auspices of NATO.

An active member in professional and honorary societies, and winner of the 1957 Research Award of the Southeastern Section of the American Society for Engineering Education, Dr. Nash also serves his profession as the Associate Editor of *Applied Mechanics Review* and as a member of the Advisory Panel, National Science Foundation. Sponsored by various governmental agencies, he has visited laboratories throughout Europe to observe current research and has lectured widely both in the United States and abroad.

1957—George Gerard
1958—C. M. Sliepcevich
1959—R. Byron Bird
1960—Ali B. Cambel

ASEE Awards

Besides the four major awards presented at the Annual Banquet at Lexington on June 29, three other awards were presented at the Annual Meeting for distinguished performance in specific areas of engineering education.

The James H. McGraw Award

Each year the Technical Institute Division presents to an outstanding contributor to Technical Institute education the James H. McGraw Award. Established in 1950 by the McGraw-Hill Book Company in memory of James H. McGraw, the Award consists of $500 and an appropriately engraved certificate. There have been eleven previous winners of this Award: Harry P. Hammond (1950), Robert H. Spahr (1951), Arthur L. Williston (1952), Charles W. Beese (1953), Arthur C. Harper (1954), Frederick E. Dobbs (1955), Charles S. Jones (1956), Arthur L. Townsend (1957), Karl O. Werwath (1958), Henry P. Adams (1959), and Kenneth L. Holderman (1960).

The Award for 1961 went to H. Russell Beatty, President of Wentworth Institute and long prominent in the Technical Institute movement. President Beatty has been a member of ASEE since 1937.

Engineering Graphics Distinguished Service Award

The Distinguished Service Award is presented by the Engineering Graphics Division to express the deep appreciation of the Division and acknowledge by means of a certificate and citation the many distinguished services rendered by the recipient as a teacher of engineering graphics.

The Award for 1961 went to William E. Street, Professor and Head of Engineering Graphics at The Agricultural and Mechanical College of Texas and a member of ASEE since 1929.

Engineering Graphics Nomography Award

The Nomography Award is presented each year by the Graphics Division for the best nomogram published during the past year. This year the Award was made with the cooperation of the International Harvester Company.

The Nomography Award of $100 was presented to Harvey Meeusen, Diesel Equipment Division, General Motors, for his article, "The Application of Nomograms to the Solution of an Engineering Problem," published in the *General Motors Engineering Journal*, Vol. 7, No. 1, and to M. E. Arthur, International Business Machines Corp., Federal System Division, for his article, "A Nomogram for Voltage Divider," published in *Electrical Design News*, November, 1960.

Engineering Education in Our Age

Theodore von Kármán

First we may ask what is the definition of Engineering Education? I read once that it is transferring the experience of one generation to the next. I don't think this really covers the whole meaning of Engineering Education, and it was recognized very early that the transmission of experience is not sufficient.

The great British engineer Rankine said, "A practical engineer is a man who perpetuates the mistakes of his predecessors!" I don't want to say anything against the Practical Engineer, but Rankine was among the first who thought that the transmission of empirical data, the transmission of empirical knowledge, is not sufficient.

You cannot say anything against empirical data. I understand, for example, that hydraulics, which I once, somewhat irreverently, called "the science of variable constants," could not start with the real theory of hydrodynamics.

Even now we are not so far that we understand all the phenomena of turbulent motion. And after all, rivers and most motion in pipes and channels are turbulent motions. A great German scientist said that before he dies he would like to understand the Quantum Theory and the laws of turbulence. However, if he cannot accomplish this in his lifetime, he hopes that his Creator will explain to him the Quantum Theory!

Thus in many fields empirical data and empirical rules are very important. However, we must know exactly for which cases we want empirical data, and in which domains they can be employed.

Some people say an engineer is a scientist. I don't think that is quite correct. The purpose of engineering education is not only to educate scientists. After all, the engineer is a man who creates—not only ideas, not only theories, but also bridges, machines, airplanes—what we in the aeronautical industry call "hardware." And his purpose is creating hardware. So we should not underestimate his faculty and his talent for design. Unfortunately, I believe that talent for design is more or less something you bring with you, but you can develop and improve it. But it is something one must be born with.

Today we cannot design by intuition alone. The engineering student, in addition to his ability to design something, must also understand the fundamentals of natural sciences. If he is producing hardware, if he is producing machines, and in doing so works with materials, then he must understand fundamentals of natural sciences. But I believe that if he wants to become an executive, if he is interested in sales, interested in administrative problems, he should also understand the fundamentals of the social sciences. I think this is very important.

A lack of fundamentals in natural sciences has sometimes been rather serious in civil engineering and also, I would say, in mechanical engineering. The aeronautical engineer has been in a better position, because aeronautical engineering and aeronautical science started almost at the same time, and developed in parallel.

In 1953 we had the fiftieth anniversary of the first flight. In aeronautical science, Professor Prandtl, who was also my teacher in Germany, presented the concept of the boundary layer in 1904. And so, almost at the same time as flight became a practical reality, and within ten years started to become an industry, the ideas necessary to understand such things as frictional resistance, stall, separation, and so on—fundamental problems in aeronautical engineering—were developed into a science. Also we must recognize that the main chapters of supersonic aerodynamics were already developed before the sound barrier was broken.

Thus the aeronautical engineering student is in a relatively fortunate position because he can follow technical progress and the progress of science at the same time. There is one great difficulty in aeronautical engineering however; the field is becoming larger and larger. When we started aerodynamics we could consider air to be an incompressible fluid like water. And this approximation facilitated the solution of many practical problems.

Then, as the velocities increased and we came into the transonic region, consideration of thermodynamics became necessary.

I remember the time at which the so-called compressibility effect started to play a role in airplane design. I was invited to one of the large airplane companies in California. They had terrible vibrations in the wing, and the flutter man said, "This is flutter." I looked at the records and the design a little and told him, "I am sorry, but this has nothing to do with ordinary flutter. The vibrations are caused by shock waves." Later, they looked at the wings by means of Schlieren-photography and the shocks were there. So our science became much more complicated with thermodynamics playing an important role.

Fortunately, at the time we did not need to learn much of chemistry, for most of the engine companies had chemists, specialists who knew about "anti-knock" and that was sufficient. But after the piston engine was replaced by the jet, this method did not work any more, because you could no longer separate flow phenomena from the chemical process of combustion. As hypersonic velocities come into the picture with missiles, you also have chemical reactions that you don't want. After all, if you want to burn kerosene the chemical reaction is something you definitely want and plan for. But if you have a missile and it enters the dense atmosphere, you have high temperature, dissociation and recombination; i.e., you have reactions which you don't want. Nature produces them and you have to understand them.

I proposed the name "aero-thermo-chemistry" for this branch of science. The word "aerothermodynamics" was proposed by an Italian aerodynamicist, General Crocco. After that I said, "Now we have not only aerothermodynamics but aero-thermo-chemistry." I was very much amused that a western university held a symposium on "aero-thermo-chemistry" three or four months later.

As we become interested in space flight and new methods of propulsion, it turns out that even chemistry is not enough. We need electromagnetism. Among the many other institutions, Cornell University is one of the centers where this new branch of aero-dynamics—what we call "magnetohydrodynamics" — is successfully cultivated.

(I am against this name because for me "hydro" has something to do with water. It should be "magneto-fluid-dynamics," or better still, "magneto-fluid-mechanics," but it may be too late to change.)

So you see the aeronautical engineer of today must be interested in all these neighboring sciences, not only mechanics, thermodynamics, but also chemistry and especially chemical kinetics and electromagnetic theory.

The word "space" created something of a panic, I would say, in industry and perhaps also in science. Even the Institute of Aeronautical Sciences changed the name to Aero/Space Sciences. However, I don't think that we should say that Aeronautical Science is finished now that Aero/Space Science has started. First,

the new science is only an extension of the old one, for I consider that the change means that we have new ideas on speed limits and new ideas on high altitude. But that is the natural progress.

So I do not believe there is any reason to say that aerodynamics is obsolete. There is no reason to say, "I am an airplane designer; what shall I do? Nobody wants airplanes."

First, for some years we'll need airplanes. Second, the problems we had in airplane design we also have in missile design and in the design of any other vehicles. It would be a miracle if we could produce vehicles for space or vehicles for the upper atmosphere and not have the same problems—buckling, flutter, and so on—that we had in airplane design.

The great problem in my opinion is to find a way how to teach, without increasing the number of years necessary for the education of a young man, so that he learns to understand the fundamentals of natural sciences, especially physics and chemistry, and at the same time will be able to create new designs. Of course you can say that, for example, the industrial employer does not expect that they can put a young engineer just coming from college in charge of design; they are willing to grant him a kind of period of apprenticeship on their expense. However, the way to proceed from theories to practical conclusions has to be taught in school and this is a hard task for most engineering schools; it requires really high quality teachers. Nevertheless, I believe to solve this problem is the main task of our engineering colleges and only the solution of this problem can stop the trend among our young students away from engineering toward science.

NSF GRADUATE FELLOWSHIPS

Applications are now being accepted in two National Science Foundation graduate-level fellowship programs: Cooperative Graduate Fellowships for the academic year 1962-1963, and Summer Fellowships for Graduate Teaching Assistants, for the summer of 1962. Applications for Cooperative Graduate Fellowships must be received by the participating institutions by November 1, 1961; applications for Summer Fellowships, December 8, 1961.

The two fellowship programs are administered cooperatively by the National Science Foundation and institutions of higher education in the United States which confer doctoral-level degrees in mathematics, engineering, and the sciences. One hundred and sixty-five institutions will participate in the Cooperative Graduate Fellowship program and all but six of these will also participate in the program of Summer Fellowships for Graduate Teaching Assistants.

In both programs, individuals apply through the participating institutions for initial evaluation by local faculty committees, and all applications are then forwarded to NSF. Panels of scientist-scholars appointed by the National Academy of Sciences-National Research Council perform final evaluation. Ability is the sole criterion for making judgments.

A Cooperative Graduate Fellow will receive a stipend of $2400 for a full year's tenure or $1800 for the academic year. His institution may augment this basic stipend by as much as $1000 for 12 months or $750 for 9 months. A Summer Fellow in the Graduate Teaching Assistant program will receive a stipend ranging between $50 and $75 per week, the exact amount to be determined by his institution.

Application materials can be obtained from the Graduate Dean of any participating institution or from the Fellowships Section, Division of Scientific Personnel and Education, National Science Foundation, Washington 25, D. C.

National Science Foundation Fellowships

SUPPORT OF TRAINING IN ENGINEERING

In 1952 the National Science Foundation established its Graduate and Postdoctoral Fellowship programs. Subsequently, five additional fellowship programs were initiated by the Foundation to assist in meeting the varied needs of graduate students, high school and college teachers, research workers and advanced scholars, in the fields of science, mathematics, and engineering. One of these programs, however—Summer Fellowships for Secondary School Teachers—is not directly pertinent to training in engineering. The growth of each of these programs in terms of the total numbers of applications and awards in all fields is indicated in Figure 1.

Demand for NSF Fellowships in Engineering

Table 1 below shows the number of applicants in engineering by program and year, expressed as a per cent of the corresponding total number of applicants in all fields.

From 1952 to 1961 the percentage of engineering applicants in the Graduate program has nearly doubled, rising from 9.9 in the first year of the program to 18.3 in FY 1960 and 18.2 in FY 1961. In the newer Cooperative Graduate program, in which individuals apply through the schools they expect to attend as Fellows, the proportion of engineering applicants to applicants in all fields has been slightly better than in the Graduate program. In the Program of Summer Fellowships for Graduate Teaching Assistants, engineering applicants appear to have less interest in applying, perhaps owing to the availability of jobs in engineering projects in the summer.

In the fellowship programs which provide support for individuals with doctorates for advanced research work, there has been a low proportion of engineering applicants as compared with applicants in other fields of science and in mathematics. In the Postdoctoral program, for instance, applicants from engineering constituted a negligible percentage of all applicants in the years before 1960. In the past two competitions, however, the proportion of engineering applicants has more than tripled and if this trend continues will soon amount to a significant proportion of all applicants. A similar pattern prevails in the Senior Postdoctoral program, where the percentage of applicants in engineering has increased

NATIONAL SCIENCE FOUNDATION FELLOWSHIPS

TABLE 1—PROPORTION OF ENGINEERING APPLICANTS TO APPLICANTS IN ALL FIELDS

Fiscal Year	Graduate	Cooperative Graduate	Graduate Teaching Assistants	Postdoctoral	Senior Postdoctoral	Science Faculty
1952	9.9%	—	—	1.1%	—	—
1953	11.1	—	—	1.6	—	—
1954	12.3	—	—	1.3	—	—
1955	14.4	—	—	1.7	—	—
1956	14.6	—	—	2.2	1.9%	—
1957	14.1	—	—	1.2	3.0	13.2%
1958	15.4	—	—	1.6	2.7	16.6
1959	17.9	18.6%	10.2%	1.5	7.9	27.5
1960	18.3	20.1	11.5	3.6	6.6	25.4
1961	18.2	20.1	9.8	4.1	8.7	27.3

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25.4
27.3

Oct. 196

CALL FOR PAPERS

A call for papers for presentation at three general sessions for the 1962 Annual Meeting at the Air Force Academy, Colorado, June 18-22, is being made. Turn the page for specific information.

September 30, 1961

CALL FOR PAPERS

1962 Annual Meeting
American Society for Engineering Education

The next annual meeting of the American Society for Engineering Education will be held at the Air Force Academy, Colorado, on June 18-22, 1962. The theme of the meeting is "Interdisciplinary Challenges in Engineering Education." The appropriate program committees are particularly interested in original, forward looking papers for the programs in the three areas listed below. Presentations will be made at the general sessions, the meetings scheduled for attendance by everyone, regardless of specialization.

Prospective speakers should submit a title and a 400 to 500 word abstract or outline of what they propose to present to those listed below by November 10, 1961. Detailed information about the proposed programs also can be obtained from them. Selections will be made by January 1, 1962, and each person will be informed of the decision regarding his proposal at that time.

1. **The teaching of materials to engineers—an interdisciplinary problem?**

   Sponsored by the Materials Committee

   Sumbit papers to:—Dr. J. A. Pask
   Professor of Ceramic Engineering
   University of California
   Berkeley, California

2. **Interdisciplinary research and graduate study programs**

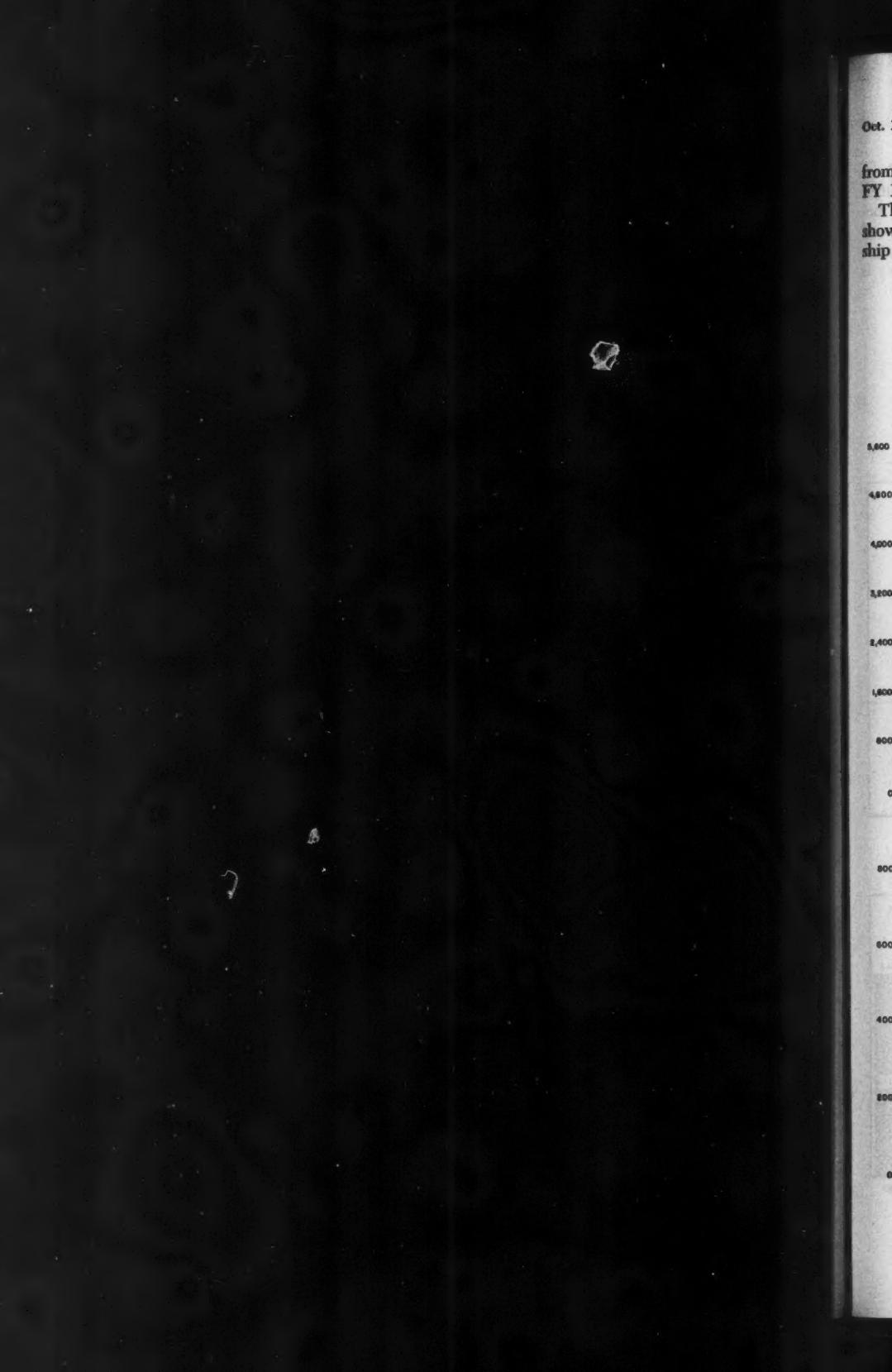
   Sponsored by the Engineering College Research Council

   Submit papers to:—Dr. T. L. Martin, Jr.
   Dean of Engineering
   University of Arizona
   Tucson, Arizona

3. **Undergraduate interdisciplinary instruction**

   Sponsored by the Engineering College Administrative Council

   Submit papers to:—Dean R. H. Roy
   School of Engineering
   Johns Hopkins University
   Baltimore 18, Maryland



from 1.9 in the first year of the program, FY 1956, to 8.7 in FY 1961.

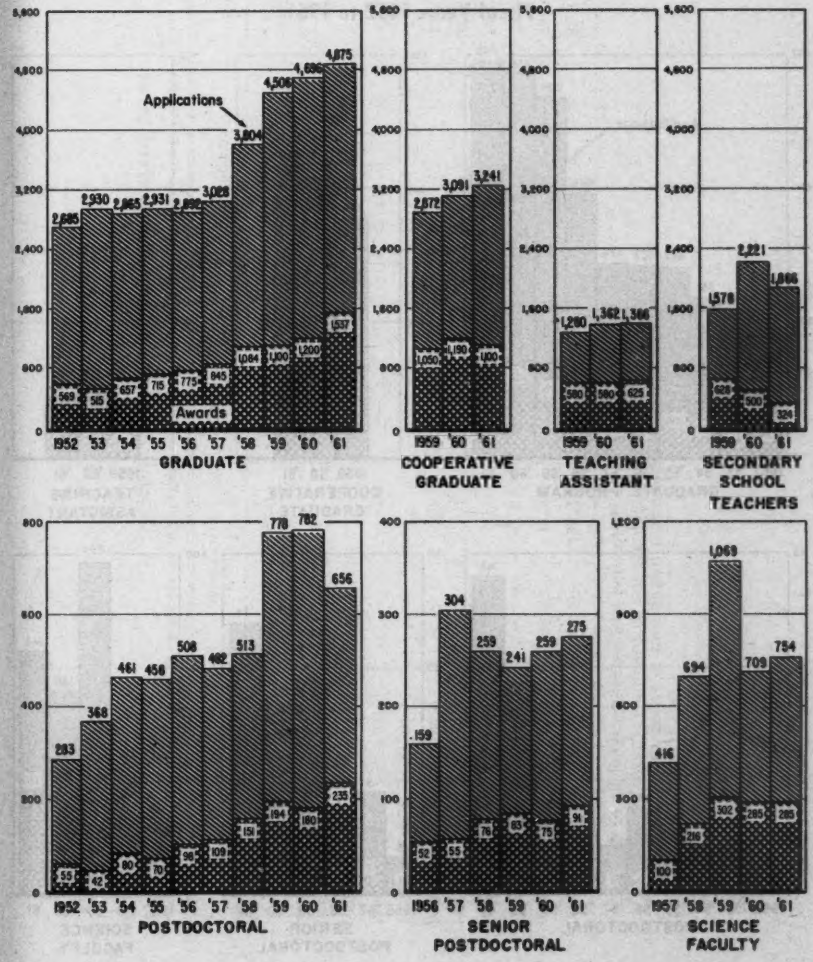
The engineers have made their best showing in the Science Faculty Fellowship Program. The proportion of college teachers of engineering has doubled during the five years the program has been in operation; in the past three years it has been slightly more than 25 per cent. The success of the engineering applicants

Figure 1

NATIONAL SCIENCE FOUNDATION

Distribution of Fellowship Applicants and Awards Offered

Fiscal Years 1952 to 1961



in winning awards in this program has also been outstanding.

Success of Applicants in Engineering

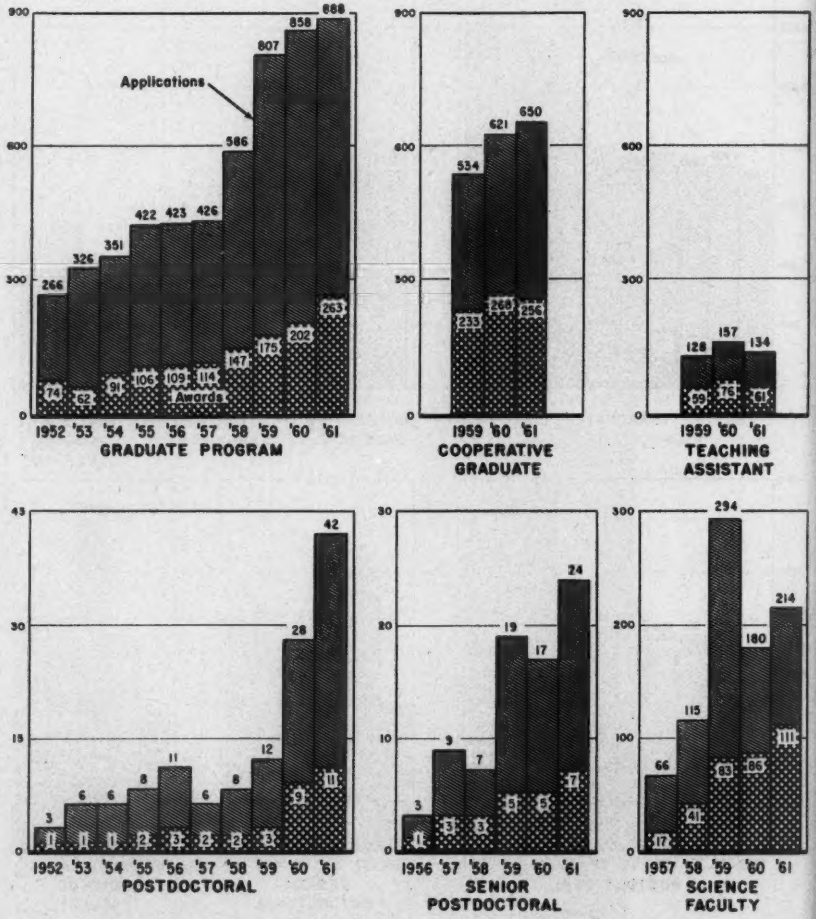
The Congressional Act establishing the National Science Foundation requires that individuals be selected for fellowships "solely on the basis of ability." Only in cases of direct competition between two or more qualified persons of substantially equal ability (such competition resulting from limited funds) is

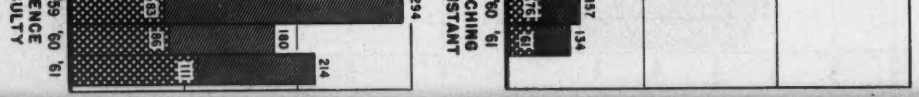
Figure 2

NATIONAL SCIENCE FOUNDATION

Distribution of Engineering Fellowship Applicants and Awards Offered

Fiscal Years 1952 to 1961





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NATIONAL SCIENCE FOUNDATION FELLOWSHIPS

TABLE 2—SUCCESS OF ENGINEERING APPLICANTS COMPARED WITH SUCCESS OF APPLICANTS IN ALL FIELDS

Fiscal Year	Graduate		Cooperative Graduate		Graduate Teaching Assistants		Postdoctoral		Senior Postdoctoral		Science Faculty	
	All[1] Fields	Engi-[2] neering	All Fields	Engi-neering	All Fields	Engi-neering	All Fields	Engi-neering	All Fields	Engi-neering	All Fields	Engi-neering
1952	21.2%	27.8%	—	—	—	—	19.4%	[3]	—	—	—	—
1953	17.6	19.0	—	—	—	—	11.4	[3]	—	—	—	—
1954	22.9	25.9	—	—	—	—	17.4	[3]	—	—	—	—
1955	24.4	25.1	—	—	—	—	15.3	[3]	—	—	—	—
1956	26.8	25.8	—	—	—	—	19.3	[3]	32.7%	[3]	—	—
1957	27.9	26.8	—	—	—	—	22.6	[3]	18.1	[3]	24.0%	25.8%
1958	28.5	25.1	—	—	—	—	29.4	[3]	29.3	[3]	31.1	35.7
1959	24.4	21.7	36.5%	43.6%	46.0%	46.1%	24.9	[3]	34.4	26.3%	28.3	28.2
1960	25.6	23.5	38.5	43.2	42.6	48.4	23.0	32.1%	29.0	29.4	40.2	47.8
1961	31.5	29.6	33.9	39.4	45.8	45.5	35.8	29.6	33.1	29.2	37.8	51.9

[1]Awards in all fields expressed as a percentage of all applicants.
[2]Engineering awards expressed as a percentage of engineering applicants.
[3]Too few cases to derive a meaningful percentage.

NATIONAL SCIENCE FOUNDATION FELLOWSHIPS

TABLE 3—DISTRIBUTION OF APPLICANTS AND AWARDS OFFERED BY FIELD OF STUDY FOR FISCAL YEAR 1961

FIELD	GRADUATE		COOPERATIVE GRADUATE		GRAD. TEACHING ASSISTANTS		POSTDOCTORAL		SENIOR POSTDOCTORAL		SCIENCE FACULTY	
	Applicants	Awards	Applicants	Awards	Applicants	Awards	Applicants	Awards	Applicants	Awards	Applicants	Awards
ENGINEERING												
Aeronautical	55	17	36	10	2	1	2	1	1	0	0	0
Chemical	177	74	148	66	38	14	5	1	3	2	6	0
Civil	48	4	41	11	15	5	1	0	0	0	34	20
Electrical	126	45	111	52	17	8	4	0	0	0	27	17
Electronics	129	42	65	31	7	6	2	2	1	0	13	8
Engineering Mechanics	43	4	29	7	8	6	4	0	4	1	38	19
Mechanical	123	38	107	43	30	14	2	1	3	2	37	21
Metallurgy & Met. Engineering	29	7	33	9	3	2	4	2	2	0	4	4
Nuclear	73	10	31	12	3	1	0	0	1	1	7	5
Engineering, other	85	22	49	15	11	4	3	1	9	1	48	17
Subtotal	888	263	650	256	134	61	27	8	24	7	214	111
LIFE SCIENCES	1,173	347	759	186	420	175	264	75	110	35	141	42
PHYSICAL SCIENCES	2,694	893	1,713	626	755	362	349	149	123	45	399	132
SELECTED SOCIAL SCIENCES	120	34	119	32	57	27	16	3	18	4	[1]	—
TOTAL	4,875	1,537	3,241	1,100	1,366	625	656	235	275	91	754	285

[1]In the Science Faculty Fellowship Program, awards were not made in the Social Sciences in Fiscal Year 1961. Beginning in Fiscal Year 1962, the Social Sciences will be included in the program.

consideration of a geographic factor authorized.

In these competitions, the applicant's scholastic record and test scores (where applicable) speak for themselves; he names his own references, his application is evaluated by panels of recognized scientists in his own general field of science, and experience has shown that the panelists carry out the evaluation process very carefully and conscientiously. How do applicants in engineering fare in these competitions?

In Figure 2, the number of applications and awards offered in engineering is shown for each fellowship program for each year of its operation.

Table 2 shows in percentages for each program and year the success of applicants in engineering as compared with the success of applicants in all fields. Altogether, the engineers have more than held their own in the programs in support of graduate study and have done very well in the Science Faculty program. Because of the low proportion of engineering applicants in the postdoctoral programs, the percentages given are not as meaningful.

Table 3 indicates the distribution of applications and awards offered among several subdivisions of engineering in the 1961 competitions. Included in the subdivision "Engineering, other" are agricultural, ceramic, hydraulic, industrial, mining, petroleum, safety, and sanitary engineering, engineering sciences, and other divisions not elsewhere classified. The distribution in Table 3 represents reasonably well the distribution that has occurred in previous years.

Ford Foundation Experiments with Forgivable Loans for Prospective Engineering Teachers

Since 1959 the Ford Foundation's Science and Engineering Program has been experimenting with forgivable loans as a form of graduate student aid. In that year grants were made to nine engineering institutions across the nation for experiments with various methods of faculty strengthening. One of these methods was to foster doctoral engineering study by people interested in engineering faculty careers by offering them fellowships. These fellowships could be used either separately or in combination with loans whose repayment would be cancelled at the rate of $600 for every year of engineering teaching the recipient did after finishing graduate study. Under these provisions in the nine grants the fellowship and loan funds were used at the discretion of each institution to supplement other forms of student aid, such as research assistantships. The schools administering forgivable loan funds under this experiment are: the University of Michigan, Massachusetts Institute of Technology, Purdue University, the University of Illinois, Stanford University, Carnegie Institute of Technology, California Institute of Technology, the University of California at Berkeley, the University of Wisconsin. Forgivable loans on similar terms have also been incorporated into non-experimental grants for general strengthening of doctoral engineering education at Princeton University, Stanford University, Cornell University, the University of Florida, Georgia Institute of Technology, North Carolina State College, and the University of Texas.

Analysis of the use of these funds by the first nine schools led in early 1961 to

a separate nationwide experiment with forgivable loans as a specific technique of student aid and faculty recruitment. The theory behind this experiment is that many highly qualified holders of engineering baccalaureates are motivated toward teaching but diverted from or impeded in the necessary graduate study by legitimate financial needs that are higher than can be met by conventional predoctoral fellowships and assistantships, which are geared to the needs of single men. This condition may be reinforced by the fact that the profession offers good pay and intellectual satisfaction to all holders of engineering baccalaureates immediately on graduation. The forgivable loan experiment, therefore, was conceived to discover whether there were many able engineering graduates motivated toward teaching who could be attracted into or helped to complete doctoral study by a scale of student aid geared to the needs of young families.

In each of ten representative engineering schools, funds were made available by the Foundation out of which up to $10,000 could be loaned, as a supplement to other income, to a certain number of predoctoral students interested in an engineering teaching career. In each case the student has to be at least as academically distinguished as a conventional fellowship holder, but must show legitimate needs to justify the high level of support, and must devote substantially full time to a program of study leading him to the doctorate within three years after starting graduate study. The loan will be cancelled at the rate of $1000 per year for every year of engineering teaching the recipient completes after he finishes graduate study; if he leaves teaching, he will have to repay the loan at the same rate.

Although complete data for the next academic year are not yet in hand, it is probable that the ten schools administering this latest experiment have already chosen enough loan recipients to have substantially engaged all funds available under the Ford grants for this purpose. The ten schools are: Harvard University, Illinois Institute of Technology, Iowa State University, New York University, the University of Minnesota, Northwestern University, Rensselaer Polytechnic Institute, Washington University (St. Louis), Virginia Polytechnic Institute, and Columbia University.

When complete data have been received and evaluated, the Foundation's Science and Engineering Program will decide what will be its future interest and activity in financial support for prospective engineering teachers.

In view of the interest that these experiments have elicited among actual and prospective graduate students of engineering, it should be noted that the loans have been and are administered entirely by the schools concerned. Any inquiries about conditions of eligibility or about the availability of such loans should therefore be addressed to the Dean of Engineering at one of those schools.

NUCLEAR ENGINEERING AT WISCONSIN

The University of Wisconsin faculty has approved a new curriculum leading to the degree of bachelor of science, nuclear engineering.

Undergraduate students as well as graduate students will be able to study nuclear engineering in the UW College of Engineering beginning next fall. Under the new curriculum, from 40 to 44 per cent of the student's studies will be in the basic sciences, also 40 to 44 per cent in engineering, and from 16 to 20 per cent in non-technical courses.

The UW College of Engineering's nuclear engineering program was started three years ago for graduate students only, granting master of science degrees only during its first two years. The program was enlarged a year ago to grant also Ph.D. degrees.

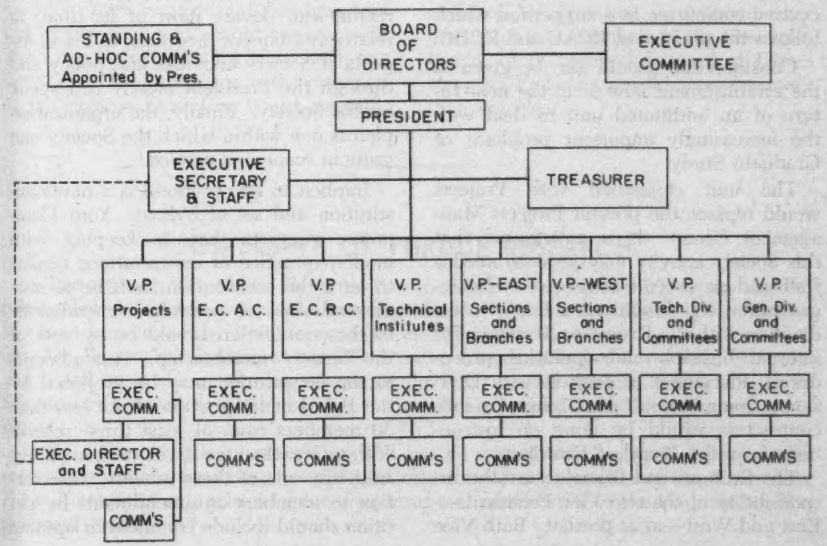
A New Shape . . .

for the Old Society

At the June meeting, the Long Range Planning Committee presented to the President and Executive Board of ASEE a proposal for reorganization of the Society. This new organization is designed with clear lines of authority and responsibility, effective channels of communication and action between the membership and the Society management, and adequate representation of all elements of the Society in management and policy control without a large, cumbersome governing body.

The proposed organization is capable of prompt action when a Society point of view or opinion on engineering education and research questions should be presented to outside agencies, professional societies, or to the public. The proposed Board of Directors will have clear responsibility and authority instead of the present division of responsibility between General Council and the Executive Board. The new Board can devote its major attention to questions of policy and Society welfare with an Executive Committee of the Board handling the more routine details of fiscal and staff operation.

The organization chart is similar to that of many corporate organizations. Each of the several operating units of the Society reports to the President and the Board through its Vice President, who is a member of the Board. The suggested composition of the Board of Directors is:



President (chairman)
Vice Presidents (8)
Treasurer
Past Presidents (2)
Executive Secretary—*ex officio*, without vote.

The Executive Committee consists of
President (chairman)
Treasurer
Two board members named by Board
Executive Secretary—*ex officio*, without vote.

Various standing and *ad hoc* committees appointed by the President will report to the Board.

The Executive Secretary and staff report to the President and Board. Seven operating units each with a Vice President, except that for Sections and Branches, which has two, is suggested to provide for present Divisional and Council activities, a Technical Institute Council, and a new unit for Projects. Each of these operating units may be structured internally as at present or as the interested Society members may wish to develop the detailed organization for improved function and service to the membership. Each unit is shown with an executive committee as a suggestion which follows the practice of ECAC and ECRC.

Consideration should also be given to the establishment now or in the near future of an additional unit to deal with the increasingly important problems of Graduate Study.

The unit concerned with Projects would replace the present Projects Management Group. It is anticipated that this Society activity may grow to need a staff and an executive director. The organization chart indicates a line of coordination with the Executive Secretary for internal business and operating procedures. Placement of projects with Divisions, Committees, Task Groups, or subcontractors would be done on instructions from the Board of Directors.

The Sections and Branches are the responsibility of the two Vice Presidents—East and West—as at present. Both Vice Presidents serve on the Board of Directors and, as at present, one will be junior to the other as established by year of election to office.

The Divisions and Committees are grouped as at present each with a Vice President, one for General Division and committee affairs and the other for Instructional Divisions and committees. Any internal restructuring or regrouping for better functioning and service to the Society membership can be done within this broad framework. The present disparity of representation in Society management as between Divisions and Committees would no longer exist. All would be represented at Board level through the two Vice Presidents. The Committee believes that within these two Division and Committee groupings there is greater flexibility than now exists. The integration of new disciplines or serving of interdisciplinary needs is simplified.

The Long Range Planning Committee believes that the proposed scheme of organization would make for more efficient Society operation and provide channels through which better member participation can be achieved. The plan preserves the best features of our present organization. Most important, the Board of Directors can devote most of its time, in relatively frequent meetings, to broad aspects of Society activities and policy and through the President clearly can speak for the Society. Finally, the organization plan is one within which the Society can grow in scope and service.

Implicit in this proposal is a new constitution and set of bylaws. Your Committee suggests that, in keeping with modern practice of organizations similar to ours, the constitution itself be as simple and short as possible. Amendments to the constitution should be by vote of the Society membership. Amendments to the constitution may be proposed by the Board or by petition of not less than 50 members from at least three schools with no less than ten petitioning members from any one of these schools. Information to members on amendments by petition should include comment or opinion

of the Board of Directors. The bylaws should contain the necessary detail for satisfactory operation and should be modified from time to time by the Board of Directors as required. The present special status of ECAC and ECRC with respect to approval of constitutional amendments and bylaw changes should not be continued.

The constitution should provide for succession of officers in event of vacancy. Also provision should be made for nomination and method of election of officers.

Location of Headquarters Office

Your Committee considered the question of best location of the office of Executive Secretary and staff. In our present uninformed position we can only render an off-hand opinion that the increasing importance of external contact with foundations, governmental agencies, professional societies, and federal legislative bodies suggests a location in Washington or New York. At the same time the Committee expressed concern that intangibles may be lost if headquarters is not on a college campus. Also, additional costs would be incurred in a new mode of operation.

Our conclusion is that a Washington or New York location for headquarters has much merit and should be explored. The Long Range Planning Committee believes that this exploration is the province of the present Executive Board, or such special committee it may choose to designate.

President-Elect

Your committee has considered the suggestion that a new President of the Society be designated at such time as will give him a chance to participate for approximately a year before assuming office. Some experience indicates that the present election date leaves insufficient time for phasing-in with Society business. Other experience suggests that the present timing and attendance at Executive Board meetings is satisfactory. Moreover, some concern was expressed by the Committee that if a President-elect had been designated a year in advance the President would feel constrained to seek concurrence of his successor on all but extremely short-term issues. Hence our Committee believes that until experience dictates otherwise the present timing of election of President and his integration into Board activities is satisfactory. The official nominee should be invited to the first possible Board meeting even though in advance of final election.

Nominee for President

Your committee recommends that the nominee for President be selected from present or past members of the Executive Board, or the proposed Board of Directors. No President should serve for more than one year.

POWERS VP OF PURDUE RESEARCH

The appointment of Dr. Philip N. Powers, head of the Purdue University department of nuclear engineering, as a vice-president of the Purdue Research Foundation has been announced by Foundation President Frederick L. Hovde.

Dr. Powers, recognized as one of the nation's leading figures in the field of nucleonics, will be in charge of research grants and contracts for the foundation. Dr. R. B. Stewart, vice-president and general manager of the foundation, is its senior executive officer.

Dr. Powers' major responsibility will be the overall development of support for research programs involving the different schools and departments of the University. He will continue as nuclear engineering head and on the staff of the Engineering Experiment Station.

A Word For
THE VOICE OF ENGINEERING EDUCATION[1]

PAUL T. BRYANT

Editor, JOURNAL OF ENGINEERING EDUCATION

The JOURNAL OF ENGINEERING EDUCATION is the voice of engineering education, the only nationally and internationally circulated journal that speaks for the engineering educator. At the same time, it is the only journal that can speak *to* engineering educators as a group. The JOURNAL is read by more than 11,500 educators, researchers, administrators, students, and others interested in engineering education. It goes to every engineering school in the United States with ECPD-accredited curricula, more than 75 other colleges, universities, and technical institutes, to professional organizations, and to more than 200 private companies. It is sent to 44 foreign countries, and sometimes comes back to haunt American technical assistance missions overseas by being quoted as an authority by our foreign readers—not always in agreement with our mission's engineers.

The point of all this is that the JOURNAL OF ENGINEERING EDUCATION is a voice heard throughout engineering education. Young engineers are regularly reminded of the importance of an ability to express their ideas. They are told this ability can lead to promotions, recognition, prestige, success. Without this ability, they are told, an engineer is handicapped. The same can be said for engineering education. If engineering educators do not speak for themselves, and speak well, their hopes for success must be limited. They must speak to each other—communicate their ideas, aims, purposes, techniques, so that all may benefit from the experience and wisdom of each—and they must speak to the rest of our society so that others will understand what engineering education is doing and how it affects them. Engineering educators, like any other engineer, have responsibilities to their profession and to society. They must communicate if they are to live up to those responsibilities. The JOURNAL OF ENGINEERING EDUCATION is the medium through which they can communicate. The success of the profession, like that of the individual engineer, will depend upon how well this communication takes place. The mission of the JOURNAL is effective communication.

The Core

The essential core of the JOURNAL is papers by engineering educators and others concerned with engineering education. During the 1960-1961 publishing year, a total of 336 manuscripts were submitted. Of these, 98 were published, 166 were returned to the authors, and 72 are still under review at the time of this writing. Besides the 98 papers, 45 special features were also published during the year. Of the total papers published, 28 were from the 1960 Annual Meeting at Purdue.

[1]Condensed from the Report of the Editor of the JOURNAL OF ENGINEERING EDUCATION, June, 1961.

When the JOURNAL can publish less than 30 per cent of the papers submitted, the matter of selection becomes important to the quality and effectiveness of the magazine. Decisions as to what is published are solely the responsibility of the editor, and editors are fallible even as other men. On the other hand, the Editorial Committee of the JOURNAL, a committee composed of a widely varied group of distinguished members of the Society, advises the editor and provides reviews that deserve much credit for whatever success the JOURNAL may be achieving.

The Committee is made up of a representative from each Division and each Council, as well as representatives from some committees of the Society. These individuals review or obtain reviews for papers referred to them by the editor. They provide expert opinions from virtually every area of engineering education. The membership of the Committee is determined purely on the basis of this subject matter distribution and not geography.

The final choice of papers is made solely on their value. The rank or position of the paper's author is not, and should not be, a consideration in selecting papers for publication. The JOURNAL is not a "dean's sheet" nor is it devoted to any one field of engineering. The choice of papers is in no way subjected to pressures from Society officers or others. A quick count of authors during the past year shows that less than a third are department heads, deans, or presidents, about a third are from industry or government agencies, and about a third are teachers ranking from instructor through full professor.

Now matter how well intentioned and well advised an editor may be in his choice of papers, a situation in which less than a third of those submitted can be published means that inevitably some worthwhile papers will have to be rejected. This is regrettable, but the limits of our budget force the present limit on th number of pages published (860 this year—48 fewer than last year). If, in the future, advertising revenue or other sources of funds increase, the amount of material published in the JOURNAL may go up.

Production and Format

The staff of the JOURNAL OF ENGINEERING EDUCATION during the past year consisted of an editor half time and one secretary full time. With occasional proofreading help from others of the Headquarters staff, the JOURNAL staff handled all matters of advertising, production, layout, final selection and editing of manuscripts, classified advertising, billing of all advertising, and all correspondence with authors, reviewers, and advertisers. An important exception was the Yearbook-Directory, most of the burden of which was borne by others of the Headquarters staff.

Advertising

Despite the business slump and its accompanying reduction in advertising budgets, the JOURNAL in 1960-1961 was able to hold the advertising gains of the preceding year almost intact, with a total of 205 pages of advertising as compared with 207 the preceding year. This is especially significant in view of the 28 per cent increase registered in 1959-1960. We had hoped for a slight additional increase in 1960-1961, but the fact that we were able to hold our own during the economic slump indicates that our previous gains were based on a genuine and lasting increase in interest in the JOURNAL as an advertising medium.

The total of lines of "Teaching Positions Available" advertising for this year was 1,490 as compared with 1,404 last year and 1,007 the year before. This advertising is open to Institutional Members of ASEE, and to reputable foreign institutions, at a rate of two dollars per line. We continue to get comments on the effectiveness of this advertising, and we hope that member institutions will continue to make greater use of this service.

A new service to individuals was initiated this year in the form of "Teaching Positions Wanted" advertising. This ad-

vertising is sold at the same rate as the other, but is open to any individual regardless of membership in ASEE. In this way, individuals in industry or the military who wish to get into engineering education have a ready avenue for establishing contact with institutions interested in their services. During the past year, this new service carried a total of 116 lines.

Other Activities

Aside from the JOURNAL, the primary activity of the editor during the past year was acting as senior editor of the 1961 edition of the *Engineering College Research Review*, the bienniel publication of the Engineering College Research Council. The *Review* was published June 1. Production details on this publication were also handled by the JOURNAL office.

Envoy

This then is the anatomy of the voice of engineering education—editing, reviewing, advertising, production, and all the rest. These have been some of the details of our "days and ways" during the past year. In the year to come, we count on the support of the Society as an organization. We hope for the support of its individual members as individuals interested in the progress of engineering education. We hope the JOURNAL will continue to grow in effectiveness as the vehicle for the very latest and best in ideas and facts on engineering education.

Is Your Number Correct?

Check your Divisional interests now.

From now on all addressograph plates for individual members have a code number indicating *primary* Division affiliation and *secondary* Division affiliation, in accordance with the code numbers given below. Thus, D-37; A-3 after your name on the envelope containing this JOURNAL would mean Chemical Engineering in your *primary* Division affiliation and English your *secondary*. If there is only one identification, it means that you did not give a secondary Division affiliation when it was asked for, or else we misinterpreted what you sent in. If your current designation is not to your liking, check it against your Division listing in the *Yearbook-Directory* and send in the corrections or missing information.

A-1 Aeronautical Engineering
B-13 Agricultural Engineering
C-25 Architectural Engineering
D-37 Chemical Engineering
E-49 Civil Engineering
Constr., Hydr., Sanit., Soil Mech., Struc., Survey, Transp.
A-2 Cooperative Education
B-14 Educational Methods
C-26 Electrical Engineering
D-38 Engineering Economy
E-50 Engineering Graphics
A-3 English
B-15 Evening Engineering Education
C-27 Graduate Studies
D-39 Humanities and Social Sciences
Econ., Hist., Languages, Psych. (specify other)
E-51 Industrial Engineering
A-4 Mathematics
B-16 Mechanical Engineering
Mach. Des., Mfg. Proc., Thermo and Power
C-28 Mechanics
D-40 Mineral Technology
Geol., Min., Petrol., Met., Cer.
E-52 Physics
A-5 Relations with Industry
B-17 Technical Institute
A-7 Nuclear Engineering
B-19 Librarians
C-13 Unclassified

This coding of plates enables Society headquarters to furnish Divisions with address labels for all who wish them; both primary and secondary listings are included. Last year such lists were made available to Sections for the first time. These are some of the improved services the Society now is giving you.

What Does Headquarters Do?

An Abstract of the Annual Report of the Secretary

The annual report of the Secretary of ASEE, W. Leighton Collins, is a report on all phases of the Society's activities for the year. It is briefed here in order to avoid detail and repetition of what is in the reports of other officers.

ASEE's physical facilities grew and improved some in 1960-61. During the year the University of Illinois completed the remodeling and redecorating program for the house occupied by the Society's headquarters. The second floor work area was increased by about one-fourth, a private office was provided for the Assistant Secretary, and initial steps were taken to convert the basement into a storage and packaging area. The efforts of the University to provide needed space is sincerely appreciated.

Office Staff

ASEE's Headquarters staff had to grow faster than the space. W. F. Starkey, a journalism graduate, was added to the staff, and this addition and the decision to employ the Assistant Secretary on a calendar year basis brought the total headquarters staff to:

Secretary—¾ time during academic year and full time during the summer.

Assistant Secretary—½ time for the calendar year.

Editor—½ time for the calendar year.

Other employees—7 full time for the calendar year.

Total—8.9 on a calendar year basis.

Including part-time help, this means that the full time equivalent staff can be considered to be nine. This gives a staff-membership ratio of 0.9 per 1,000 members; this is less than half of the "less than two per 1,000" proudly claimed by a major engineering society! The need for one additional person still exists, even if the current study to convert from a hand to a machine bookkeeping system becomes feasible.

Membership

After a very slow start, 1,028 new members joined during the year. This is the second highest total for the past six years. The average for the past four years is 974. The growth of the Society is almost equally divided between those relatively new to engineering education and "old timers," i.e., those under and over 36 years of age. An analysis of the "earned degrees" of the 1,028 new members follows:

Degree	Over 36 Total 471	Under 36 Total 479	Total 950
None.....	3.5%	1.0%	2.2%
B.S.....	16.3	25.0	20.6
A.B.....	3.7	2.0	2.8
M.S.....	26.5	35.7	31.2
M.A.....	6.6	2.7	4.7
Ph.D.....	26.7	18.8	22.8
D.Sci.....	2.7	2.9	2.8
Other.....	14.0	11.9	12.9

For the first time in the history of the Society the number of individual members exceeded 10,000! But since the net gain for any year is about 57 per cent of the number of new members, the total as of July 1, 1961, will be about 9,908. Some comparative statistics for the past five years follow:

	56–57	57–58	58–59	59–60	60–61
Individual members (Yearbook)	7,450	8,067	8,753	9,120	9,531
New individual members	855	1,059	969	952	1,028
Life members	26	18	25	45	31
Resignations	210	129	184	214	237
Deaths	46	39	51	61	58
Delinquent one year's dues	364	362	418	520	501[3]
Delinquent two year's dues (to be dropped)	164	155	160	211	248[4]
Address unknown	12	31	24	35	63
Applications to be approved[1]	8	39	12	52	78
Individual dues income	$54,127	$58,483	$62,169	$73,320[2]	$77,080[2]

[1] Included in "New Individual Members."
[2] Estimated.
[3] 161 owe $7.00; 340 owe $9.00.
[4] 83 owe $14.00; 10 owe $16.00; 155 owe $18.00.

Since the faculties of our colleges of engineering are growing steadily, it is believed that a continued growth of individual membership at about the current rate can be expected for the next few years. It is necessary, however, to find ways of identifying the outstanding men in engineering education and to get them to join ASEE.

The Industrial Membership Committee prepared a list of about 500 companies which were invited to join and which subsequently were sent a copy of the preliminary program for the annual meeting as a follow-up activity.

Late in the year an invitation to become affiliate members was extended to all members of the Association of Junior Colleges, a total of about 550 schools. This category of institutional membership has by far the greatest growth potential of any, and because the number of transfer students is increasing, it is desirable to do everything possible to improve the pre-engineering instruction.

Journal of Engineering Education

The total number of pages printed this year is 860. This is 48 fewer than last year and 148 fewer than two years ago. The cost of printing the JOURNAL increased from $43,323 for 1959-60 to $45,777 for 1960-61, despite the fewer pages and a saving of $2,140 on the Yearbook-Directory resulting from having it produced by a second printer.

A total of 336 manuscripts were submitted for publication during the year; 98 were published, 166 were returned to the authors, and 72 are still under consideration. Besides the 98 papers, 45 special features also were published. Of the 98 papers published, 28 came from the 1960 Annual Meeting.

Other Publications

This year, for the first time, the ECRC *Research Review* was handled entirely within Society headquarters, under the direction of the Editor. It is estimated that half-time for a month was required of the Editor; almost a month full-time for a secretary; and 1.25 months full-time for the indexing.

The new publications of the Society are:

The Road to Graduate School—Free.

First Pan-American Congress on Engineering Education—25c.

Objective Criteria in Nuclear Engineering Education—25c.

The Society cooperated with other organizations in projects resulting in the following publications:

Salaries and Income of Engineering Teachers, 1960—with Engineering Manpower Commission. 25c.

Proceedings of the first Conference on Engineering Design Education — with Case Institute of Technology. Free.

Civil Engineering Education—with Cooper Union and ASCE. $1.00 from ASCE.

Plans were gotten under way to coordinate the publications of all Divisions. It is hoped that improved quality, distribution, and financing will result from the concept of a united rather than of a series of independent approaches.

Pro-forma Statement of 1960-61

The estimated operating income for the year is about $150,800. The similar figure for operating expenses is also about $150,800. Past audits usually have indicated favorable balances of greater magnitude than the pro forma statement. Consequently an attempt was made this year to make appropriate allowances. Both income and expenses exceed the budgeted amounts of $144,020. The increased income results from a higher interest return than anticipated and the recovery of indirect costs and salaries from special projects. The expenses exceeded the budget primarily because of the authorized addition of one person to the staff, uniformly higher operating expenses for the office, the increased expenses of ECAC, and the allocation of the increased interest to the Emergency Reserve.

Budget for 1961-62

Never before in the past seven years has the budget been as extensively discussed by the Executive Board as for this next year. The $159,160 finally adopted was a forced compromise resulting from a determination to keep the budget balanced and at the same time provide some increases in needed services, salary increases, etc. The increase in the budget over the present year is $15,140 or 10.5 per cent; the increase over this year's estimated income is $8,367 or 5.5 per cent. The situation for 1962-63 also has been considered, and a revision of the dues structure for all institutional members will be required to meet the growing needs of the Society.

Travel of Headquarters Staff

Secretary Collins spent two months in South America as an American specialist under a State Department program and represented ASEE at the First Pan American Congress on Engineering Education at Buenos Aires, Argentina, on a grant from the Ford Foundation. Other travel of the staff was limited to Society business, except for two speaking engagements by the Secretary.

Public Information

News releases regarding Society activities now are prepared in Society headquarters and sent to the Chairman of the Public Information Committee for approval before they are reproduced and mailed. Thirteen news releases were distributed during the year, exclusive of those during the Annual Meeting.

Summer Schools

Three summer schools were sponsored by Divisions, all in connection with the Annual Meeting at the University of Kentucky, as follows:

1. Industrial Engineering and Technical Institute Divisions and the Process Subdivision of the Mechanical Engineering Division, in cooperation with the National Education Committee of the American Society of Tool Engineers, June 30-July 1.
   "Research in Processing, in Industry, and in Engineering Colleges—Curriculum and Teaching."
2. Electrical Engineering Division, June 29 and 30.
   "Workshop on Direct Energy Conversion."
3. Aeronautical Engineering Division, June 30.
   "Aeronautical Curricular Planning."

Midwinter Meetings

The usual three midwinter meetings were held, as follows:

1. Relations With Industry Division, College-Industry Conference, University of Cincinnati, Feb. 2-3. The theme was "Professional Climate in Engineering."
2. Cooperative Education Division, University of Detroit, Jan. 23-25.

3. Engineering Graphics Division, University of Wichita, Jan. 18-20.

Special Projects

The number of special studies financed by grants or contracts continues to grow. A brief resume of each follows.

1. *Evaluation of Technical Institute Education:* A grant of $47,250 has been received from the National Science Foundation. The working group has been organized and the study will get under way September 1, 1961.
2. *Projects Management Group:* Only one meeting was held. The National Science Foundation has made no decision regarding the request for funds.
3. *Off-campus Graduate Study:* At the suggestion of the National Science Foundation the project was withdrawn in order that a more comprehensive study could be proposed.
4. *Visiting Engineers Program:* About two-thirds of the 90 visits authorized by a total grant of $27,200 from the National Science Foundation were made or arranged for. A grant of $24,700 has been received for 100 additional visits for each of the years 1961-62 and 1962-63.
5. *Visiting Engineer Program in Electrical Engineering:* At the suggestion of the National Science Foundation the proposal was withdrawn for further study and revision and was referred to the Electrical Engineering Division.
6. *ASEE-AEC Summer Institutes on Nuclear Energy:* For the first time some four week institutes were being held. $14,450 was received from the Atomic Energy Commission to administer the program and continue the Nuclear Energy Education Newsletter during 1960-61. The 7 institutes for the summer of 1961 and the number of attendees are:
   A. *Basic.* For college of engineering and technical institute staffs. (8 weeks)
      a. North Carolina State and Oak Ridge National Laboratory 28
      b. Purdue University and Argonne National Laboratory 27
   B. *Advanced*
      a. Thermonuclear Theory (8 weeks), University of Michigan 14
      b. Reactor Theory (8 weeks), Pennsylvania State University 15
      c. Reactor Theory (4 weeks), North Carolina State 14
      d. Reactor Laboratory, (4 weeks) Argonne Natl. Laboratory 15
      e. Reactor Experimentation, (4 weeks) Stanford University 17
7. *Objective Criteria for Nuclear Engineering Education:* This project is jointly sponsored by the American Nuclear Society and ASEE. The deliberations leading to the report (25c per copy) indicated the need for further study in some areas, and an additional $38,911 has been approved by the Atomic Energy Commission for the study of the additional questions.
8. *Reprinting and Distribution of CDEF Reports:* A grant of $10,500 has been received from the Ford Foundation for the reprinting and continued free distribution of "The Road to Graduate School" and "Teaching Tomorrow's Engineers," for the next three years.
9. *Conference on Research in the Utilization of Engineering Teachers:* A grant of $5,000 was received from the Westinghouse Educational Foundation for a three-day invitational conference. The program was developed by the Educational Methods Division. Some of the presentations have been published in the JOURNAL OF ENGINEERING EDUCATION, and an action program is being developed.

10. *Motivation for Engineering Teaching:* The Committee for the Development of Engineering Faculties, at the conclusion of its work, recommended that a motivation study of members of Tau Beta Pi be made to determine their interest in engineering teaching as a career. H. A. Foecke was employed half-time under a grant of $16,000 from the Ford Foundation to make the study. It is not expected that the report will be available until after January 1, 1962.
11. *Nuclear Energy Education Newsletter:* Publication was continued with funds provided by the Atomic Energy Commission. The amount is $1,858.50 for the ten issues for 1960-61. The editor is Dr. E. W. Rylander of the International Institute of Nuclear Science and Engineering at Argonne National Laboratory.
12. *Technical Institute Education:* All information regarding the project has been gathered together and a proposed procedure to carry out the intent of the gift is being considered by the committee. About $5,000 is in the fund.
13. *Survey of Undergraduate Equipment Needs:* The survey made for the National Science Foundation has been completed and a report submitted to NSF. No decision has yet been made by NSF to undertake such a grant program and NSF has not released the results of the study.

Other Projects in Which ASEE Participated

ASEE always is pleased to cooperate with other groups in insuring the success of programs pertinent to the aims of the Society. Such a list follows.

1. *Pan American Congress on Engineering Education:* ASEE received payment for the publications provided, for publishing the papers of the U. S. delegation in the JOURNAL OF ENGINEERING EDUCATION, and for having reprints made which sell for 25c each.
2. *Salaries and Income of Engineering Teachers:* ASEE cooperated with the Engineering Manpower Commission of EJC in making a detailed analysis of the income of engineering teachers. The title of the report is "Salaries and Income of Engineering Teachers—1961." The Secretary of the Society represents ASEE on the Manpower Commission's committee. EJC received a grant from NSF to make the study. Copies sell for 25c each.
3. *Cooper Union Conference on Civil Engineering Education:* The series of conferences have been completed and the report, "Civil Engineering Education," was published by ASCE. Copies may be purchased from ASCE for $1.00 each.
4. *First Conference on Engineering Design Education:* The invitational conference was co-sponsored by The Case Institute of Technology and ASEE. The conference was held at Case and was financed by the four schools having grants from the Ford Foundation to study engineering design. The report, "Proceedings of the First Conference on Engineering Design Education," is being distributed free of charge by ASEE, which received $260.00 for that purpose. The Conference was a follow-up activity of ASEE's report on "The Engineering Sciences and Design."
5. *Nature and Properties of Materials:* Iowa State University received a NSF grant for the second such summer institute for engineering teachers. ASEE is a co-sponsor without financial responsibility, and the Secretary represents ASEE on the planning group.
6. *Transport Phenomena:* The University of Wisconsin invited ASEE to co-sponsor, without financial responsibility, a three week summer institute on Transport Phenomena,

July 10-28, 1961. Financial support is provided by NSF.

7. *Summer Institute for Engineering Teachers:* The second two-week program is being offered by The Pennsylvania State University. It will be similar to the one held last year, and again is being financed by the Ford Foundation. ASEE has a representative on the planning group, and a formal request has been received for ASEE to be a co-sponsor.
8. *Undergraduate Research Conference:* On the recommendation of ECRC, ASEE agreed to co-sponsor, with Washington State University, an invitational conference on undergraduate research at the Illinois Institute of Technology. The date has not yet been set.
9. *Breakthroughs in Engineering Education:* ASEE was invited by the Society of Automotive Engineers to co-sponsor a program by that name at its annual meeting in Detroit, Mich., Jan. 9-13, 1961.
10. *Industry - Education Symposium:* ASEE co-sponsored the May 10, 1961 Symposium in Detroit, Michigan, at the request of the American Institute of Industrial Engineers. The theme was "Industrial Engineering in 1975."
11. *Mechanical Engineering Laboratory Instruction:* The Secretary continues to represent ASEE on the planning group, of which Dr. G. B. Carson of Ohio State University is chairman. A proposal for a grant of $131,814 has been submitted to NSF, but no action has yet been taken. ASEE has agreed to serve as a co-sponsor without financial responsibility if NSF so requests.

Intra-Society Relationships

Gradually the submission of reports, etc. is improving. The idea that there is "one ASEE" and that all Divisions, Sections, Committees, etc. are a part thereof and must function as such, is beginning to be realized. The increased activity of the Vice Presidents is a significant factor, but continued improvement will require still more leadership and responsibility on their part and on the part of Society headquarters.

Appreciation—and a Warning

Almost all of ASEE's accomplishments result from the volunteer efforts of many people. This interest has been growing steadily since 1952, when the committee to make an "Evaluation of Engineering Education" was appointed. Since then, a total of $730,000 in grants from governmental and private foundations and industry has been received by ASEE. This is concrete evidence that ASEE is doing many things! Perhaps it is not as much as it should or as much as it could be doing, but *what ASEE is and what ASEE is doing* has been good enough to attract almost 1,000 new individual members per year for the past five years! This means ASEE has something that is wanted; even though it might be "a bite" instead of "a full meal." This growth of membership is the real reward for those who have worked so long and so hard for ASEE; it is tangible evidence of the appreciation of the profession.

The growth of membership also is a warning for the future. Engineering education is still young, and ASEE must be sure it is going to grow and develop so that it can exert the leadership expected and required of it—locally, nationally, and internationally. Meeting this challenge will require the best thinking of the best people, and ASEE must find the ways and means of developing this leadership and providing the mechanism by which it can flourish.

Those who have worked and will work have the appreciation of many, and the Secretary adds his expression of gratitude.

Sections East and West

A Report for 1960-61

The regional subdivision of ASEE into Sections, and the local organization of Branches at individual schools, provide the means for "grass roots" development of Society activities and participation of all individual members. The national officers responsible for the encouragement and coordination of such activities are the Vice Presidents for Sections. The Vice President for Sections West of the Mississippi this past year was Dean M. R. Lohmann of Oklahoma State University. The Vice President for Sections East of the Mississippi was Dean Ralph G. Owens of the Illinois Institute of Technology. What follows is a condensation of the reports presented by these two vice presidents on the year's activities.

Sections West—M. R. Lohmann

The Western region of ASEE consists of seven sections. All of these sections held one regular meeting during the year. As the Vice President for West Sections is responsible for representing the Executive Board at all section meetings or arranging for the representative of the Executive Board, Vice President Lohmann attended the meeting of the Missouri-Arkansas, Southwest, and Kansas-Nebraska Sections. At the Southwest Section, the Kansas-Nebraska Section and the Missouri-Arkansas Section, he was the luncheon or banquet speaker and described in some detail the activities of ASEE at the national level. He was scheduled to attend the Pacific Southwest Section meeting, but bad weather cancelled his airplane reservations. Vice President Barlow attended the meeting of the Rocky Mountain Section, Vice President Wessman attended the meeting of the Northwest Section and Treasurer Burton attended the meeting of the North-Midwest Section. Copies of the reports of all meetings have been obtained and forwarded to the Secretary of the Society.

Correspondence was initiated with the officers of the sections early during the fall of the year and letters of congratulations were sent to all new officers following each section meeting offering the services of the Vice President for Sections West and the Executive Board of the Society.

Branches: Since many in ASEE believe that the Society would be strengthened if there were more activity at the local level, a complete list of Branches and their officers in the West Sections was compiled and forwarded to the Secretary of the Society. A letter was sent to the dean of every engineering school in the Western part of the United States encouraging the formation of Branches. Only about 15 deans replied and of these 15 replies only one indicated any interest in the formation of a Branch for his institution.

Membership: At the request of the President, the Vice Presidents for Sections assisted in the membership drive for the Society. A complete list of membership chairmen at each institution in the West Sections was compiled and forwarded to the Secretary. In addition to the literature distributed from the Headquarters Office, Vice President Lohmann sent two letters to the membership chair-

men urging them to solicit new members for the Society. In addition, a letter was written to the presidents of all institutions of higher learning in Oklahoma suggesting that they affiliate with the American Society for Engineering Education.

If the membership solicitation is to become a permanent responsibility of the vice presidents for sections, closer liaison must be established with the headquarters office and a definite plan be evolved. At the present time the Assistant Secretary, Professor Jimmy Seyler, is to prepare this plan of action for the membership drive in 1961-62.

Constitutions and Bylaws: The constitutions and bylaws of each of the sections with one exception were compiled into booklet form and sent to the Secretary; one copy remaining in the Vice President's file. The Missouri-Arkansas Section does not have a constitution and bylaws at the present time. In addition, the suggested boundaries for the sections west of the Mississippi River have been forwarded to the Secretary's office for his recommendation and the approval by the Executive Board. At this writing the sections' boundaries have not been approved.

Compilation of Programs and Minutes of Section Meetings: To aid the officers and program chairmen of the sections in planning better programs, a compilation of all of the programs and minutes of the West Sections has been compiled and distributed to the section presidents. Whether this will be valuable to the officers in preparing their programs has not been determined, although it is planned to continue the collection for another year and then attempt to make an evaluation of the results.

Recommendations: There is considerable variation in local activity of ASEE, but many believe that the strength of the Society resides in part in local activity, since many members of the Society cannot attend the Annual Meeting. Therefore, Vice President Lohmann has recommended that study be given to means of stimulating more activity at the local level.

Those institutions with Branches of the Society are most pleased with their activities, but it appears difficult to stimulate the formation of Branches at additional institutions however desirable this may be. Possibly this could be best done through members of the Society other than the deans of the colleges of engineering.

The Section meetings also vary greatly in quality and in attendance. Here Vice President Lohmann has recommended that the vice presidents for sections attempt to visit as many section meetings as possible during their first year in office so as to render better assistance and advice in his second year. While this will increase the travel expense to the Society, the present practice of having any officer attend the meeting breaks the continuity and does not greatly aid the section. The vice presidents for sections could advise the sections on alternative meeting dates, programs, dues, registration fees, etc. if he had attended more of the section meetings and had attempted to evaluate all of the programs. Better liaison needs to be established between the vice president and the section officers. This can be done by both personal visit and by frequent letters.

Sections East—R. G. Owens

The past year has been an active and fruitful one for the nine Sections comprising the group representing the East Sections of ASEE. Many fine programs were presented at their annual meetings. Three of the nine Sections scheduled their annual meetings in the fall of 1960, while the remaining six Sections scheduled their meetings in the spring of 1961. Vice President Owens attended three of the Section meetings: the Upper New York-Ontario, at the University of Buffalo, the Ohio, at Ohio State University, and the Illinois-Indiana at Illinois Institute of Technology.

No essential changes were noted from the previous year in the number and duration of meetings held by the East Sections in 1960-61. One day meetings were held by the Allegheny Section, the Illinois-Indiana Section, the Michigan

Section, and the New England Section. The Middle Atlantic Section held two one-day meetings, the one being held in December 1960 and the other in May 1961. Three of the Sections, Ohio, Southeastern and Upper New York-Ontario, scheduled events on two days.

Themes and Topics: The general format of the various meetings ranged through addresses, round table discussions and panel discussions with group participation. Themes of the annual meetings included: "The Engineer—His Relation to the World in Which We Live;" "The Use of Laboratories in Learning;" Engineering Communications;" "Industry Views the Changing Engineering Curricula."

Topics considered by Sections with no stated theme included: How do we consider the gifted student? What are engineering colleges doing for the gifted student? A reappraisal of the concept of scientific engineering; The balance between teaching and research for the engineering teacher; Nuclear research and its application to fields of engineering.

Financing: Registration fees for annual meetings ranged from fifty cents to four dollars. The financing of Section activities remained essentially the same as last year. As reported last year, registration fees for the annual meetings ranged from fifty cents to four dollars, these Sections having no Section dues. The New England Section continues to finance its activities by a twenty dollar dues fee paid by each institutional member of the Section.

Branches: The number of official Branches in the East Sections region at the present time as shown in the Yearbook of the Society is eleven. An attempt was made to establish additional Branches of the Society on campuses throughout the East Sections region. Vice President Owens regrets to report that this project did not meet with much success. Approximately 67 per cent of the deans contacted replied, indicating that the faculties of the institutions or the deans themselves had very little enthusiasm for the establishment of Branches of the Society on their campuses.

Membership: With the aid of the Secretary's office, a campaign to increase the membership of the Society was undertaken on a large scale. The deans were contacted asking them to suggest a "live wire" on their campuses to spearhead the drive for membership. A number of the deans responded and the campaign was carried out with moderate success.

Constitutions: Copies of most of the Sections' constitutions were assembled by Vice President Owens and sent to the National Secretary's office for file where they are available for comparison by any one who wishes to see them. Perhaps some standardization should be attempted, although the very nature of the differences between Sections in different geographical locations would probably preclude 100 per cent standardization. However, the Vice President noted that Section constitutions in the East Sections region ranged from one paragraph to a number of pages in length.

Conclusion: Although the attempt to increase the number of Branches of the Society did not meet with great enthusiasm in certain quarters, many members of the Society are of the opinion that Branches strengthen the Society. Vice President Owens believes that a continued effort should be made in this area.

The membership drive should be continued on a larger and more intensive scale. The results of the past year, which was the initial attempt in this area of activity on any major scale of this type, while not considered a great success, could not be considered a failure.

The overall YET program has not functioned as originally expected. Many approaches have been tried without results which could be pointed to with pride. It may be that further efforts in this area should be in integrating the younger members into the Society activities as a whole rather than encouraging a division.

The annual reports of the Sections indicated that a number of them did not have duly appointed RWI liaison members. Since the RWI activity is consid-

ered to be a very worthwhile one, the Sections should be encouraged to give greater attention to this activity. The appointment of a RWI Division liaison member appears to be the proper starting point to increase this activity.

Attempts of certain Sections to invite representatives from industry to attend Section meetings have caused difficulties because of geographically undefined boundaries. This arises in such Sections as the Middle Atlantic, Allegheny, National Capital and Upper New York-Ontario Sections, where boundaries are defined by institutions in place of states. This problem should be considered.

The Year in Divisions

A Report on ASEE Divisions for 1960-61

Instructional Divisions—
Newman A. Hall

During the past year the principal activities have been those associated with the work of the Executive Committee, the Annual Meeting Committee, and planning with reference to divisional publications.

All meetings of the Executive Committee were attended and the Executive Committee was formally represented at the New England Section Meeting at Wentworth Institute on October 15, 1960 and at the Middle Atlantic Section Meeting at Drexel Institute on December 3, 1960. In addition, on a number of occasions in connection with other obligations, it was possible to represent ASEE unofficially. Among the more significant of these has been the NSF Ad Hoc Committee on Engineering Education which was called together in Washington on February 9-10, 1961 and again on April 11-12, 1961 in New York. This informal group, supported by the Course Content Improvement Section of NSF, is sponsoring a ten-day study conference at Boulder, Colorado, this August. ASEE has a substantial interest in this activity and is well represented by current and past officers.

It has been customary for the Vice President for Instructional Divisions to serve as Chairman of the Annual Meeting Committee. This year, in addition to the routine matters pertaining to setting time and location of annual meetings, some thought has been given to long-range planning of the annual meeting organization. As we all know, the major burden of planning falls on the divisions with as much broad guidance as the Secretary can give. Many aspects of the meeting have became established in a casual way without any critical review as to whether the best interests of the Society membership are being served. It is the intention to work out more constructive policies than have been available in the past and to be able to represent more adequately the total needs of the Society. In this endeavor the interest and assistance of all Divisions, committees and Sections will be of the greatest value.

In response to many requests and inquiries from the several Divisions, considerable attention has been given to policies and practices with regard to divisional publications. This represents one of the major services of the Society to the membership, but there appears to be a real need for improved coordination of effort. As a result of extensive study, recommendations are being made which will aid in the following respects:

1. An improvement in identification as ASEE divisional publications by more consistent use of the ASEE seal and appropriate title page designations.

2. A more regular and systematic coordination of editorial practices and policies among all divisional and general ASEE publications.

3. A reexamination of the financial problems of divisional publications with particular attention given to divisional grants and subscription rates. A review of advertising policies and practices is also contemplated.

4. The handling of the circulation of divisional publications in relation to divisional membership and potential interests of others.

It is anticipated that certain improvements can be put into effect during the coming year.

In addition to these efforts undertaken during the current year, attention should be given to improved means of coordination of activity and development among the Instructional Divisions. In our engineering schools we are observing many significant realignments with much to be gained in service for newer developments in engineering practice. The ASEE divisional organizational pattern tends to be very rigid and perpetuates well established patterns easily. In view of the ASEE obligation to guide and lead the profession, some means should exist to improve flexibility and facilitate removal of any trends towards obsolescence. Creative endeavor in our divisional structure is as necessary as it is in engineering design.

General Divisions—H. W. Barlow

The past year has shown a considerable amount of constructive activity on the part of the General Divisions. Particular attention ought to be called to the activity of the Industrial Membership Committee. The number of Industrial members has grown and it is a most healthy sign.

The Relations with Industry Division has likewise been active. A number of section meetings have been held by RWI and it seems necessary to emphasize that the RWI sessions and meetings ought to be well attended by the members of the teaching profession.

The Engineering Economy Division continues to be active and is planning on holding a summer school in 1962.

The Educational Methods Division has assumed responsibility as assigned by President Walker for studying the matter of improved utilization of engineering faculty. They are sponsoring a joint meeting this year with a number of other sections on the subject of "Research on Engineering Faculty Utilization" and other topics. This is one of the most active divisions in the Society and should be encouraged.

The Technical Institute Division continues to be exceptionally active but this division will soon become a Council of the Society if the proposed Bylaws are approved.

One major change recommended is that the Engineering School Libraries Committee be assigned to the General Divisions Group and that the Engineering Graphics Division be assigned to the Curricular Divisions Group.

The Evening Engineering Education Division has been engaged in the formation of a Steering Committee for the Division and 22 educators and 11 industrialists have accepted membership on the Steering Committee.

This has been a particularly active year for the Divisions within this Vice Presidency.

PURDUE GETS NUCLEAR REACTOR

The first nuclear reactor in Indiana will be at Purdue University. Purdue signed a contract with the Lockheed Aircraft Corporation, Marietta, Ga., to construct and install a low power reactor, primarily for instructional purposes, at the West Lafayette campus. The machine, which will operate initially in the 500 to 1,000-watt range, is expected to be in use by next spring.

The Councils: 1960-61

Engineering College Research Council—R. J. Martin

The Council has experienced a busy and productive year related to the activities of its various committees, the conduct of studies and surveys, and the issuance of reports. The following summary is not intended to be all-inclusive but rather attempts to highlight the more important activities of the year.

Portions of the Bylaws of the ECRC were amended through written ballot by the current institutional membership upon the recommendations of the ECRC Executive Committee. The amendment changed paragraph 1 of Bylaw III on Membership to the form recently published in the 1961 Yearbook of ASEE, JOURNAL OF ENGINEERING EDUCATION, Vol. 51, No. 6, February 15, 1961, p. 525. *Paragraphs 2 through 9 of Bylaw III on Membership were omitted in error in the 1961 Yearbook and should be included as shown in the 1960 Yearbook.* The amendment primarily served to change the criteria for membership from the previous requirement of minimum dollars per year to a three-fold evaluation of the institution, including (a) the coordination of the research and educational programs; (b) the administrative encouragement of research; and (c) the quality of research. This revised Bylaw will be used to evaluate new applicants for membership and to judge the performance of existing member institutions for remaining in good standing as active members.

The ECRC performs its functions primarily through the activities of its Executive Committee and its various standing committees composed mainly of ECRC institutional representatives. The Executive Committee held two meetings during the year: (a) on November 16, 1960 in Washington, D. C., and (b) on March 2, 1961 in New Orleans. Various subcommittees held a number of additional meetings during the year. The functions and current projects of the various standing committees are as follows:

Relations with Federal Government: The primary function of this committee is to deal with matters affecting contracts, agreements, indirect costs, procedures, etc., between federal governmental agencies and educational institutions. The committee has been active in reviewing and discussing the new AEC Procurement Regulations. Also, special problems of institutions have been discussed with various committees and boards of the Department of Defense and the Bureau of the Budget. Close and cooperative liaison is maintained with the newly established Washington, D. C. office of the National Federation of College Business Officers Association. The committee has cooperated with NSF and other federal agencies in making surveys, pilot studies and policy papers dealing with engineering college research.

Research Administration: This committee deals with a variety of problems and projects which affect the administration of engineering college research both inside and outside the institutions. They have conducted a number of sessions for institutional representatives on the important and closely related area of graduate studies in engineering. A broad study of university research policies and practices to obtain information on organization, funding, contracting, overhead, etc., is currently being conducted in cooperation with the National Science Foundation. This group also has a subcommittee dealing with the training of undergraduates in research methods in cooperation with an NSF project. Recent

investigations have clarified the tax status of graduate students employed as research assistants but working on required thesis research for graduate credit.

Research Relations with Industry: This committee provides liaison with industrial research organizations and with the research divisions of various industrial companies associated with the Society. It has sponsored many joint programs in cooperation with the RWI divison and is now investigating a closer coordination through associate membership in ECRC of a larger number of industrial organizations and laboratories. The committee also cooperates with the U. S. Department of Commerce related to industrial research problems—particularly with the Small Business Administration of that department.

Interdisciplinary Research: This is the newest standing committee of ECRC which was formulated in recognition of the rapidly increasing amount of research being conducted in collaboration with other, non-engineering disciplines. The committee has not included studies related to interdepartmental programs between various engineering departments, since this type of program has been in operation for many years. However, the cooperation of engineering with such other non-engineering areas as the physical, biological and social sciences, medicine, architecture, agriculture, etc., is a relatively new concept which provides challenging and interesting activities. A general session of this 1961 Annual ASEE Meeting has been devoted to this interesting and important area of research.

Other Committees: Several other standing committees have very important and necessary functions which have been fulfilled extremely well during this year. Two Awards Committees have reviewed nominations and recommended candidates for the Vincent Bendix Award and the Curtis McGraw Award to be presented at the Annual Banquet. The Program Committee has done an outstanding job of selecting and obtaining speakers for the several sessions, including the Wednesday General Session for which ECRC is responsible. An unusual feature this year is two cooperative programs with the National Council of University Research Administration, an organization in which many of our institutional representatives have an interest.

1961 Engineering College Research Review: This year, through the efforts of the Editor of the Society and the institutional representatives, the ECRC has published the tenth ECRC *Research Review*. This 476-page volume presents the summary of research activities of 121 ECRC institutions and provides information on their research policies, current rate of expenditures, sources of research income, manpower engaged in research, and major areas of research interest.

Engineering College Administrative Council—H. E. Wessman

The following report summarizes the major activities of the Engineering College Administrative Council and its committees during the period July 1, 1960-June 30, 1961.

Two meetings of the Executive Committee were held, one on December 16, 1960, at Washington, D. C., and the other on June 29, 1961, at Lexington, Kentucky. Major actions taken were (a) the appointment of the Ad Hoc Committee on Faculty Recruitment, (b) the abandonment of the ECAC General Session for 1961 normally held on Thursday morning, and (c) moving the Institutional Representatives meeting from the traditional Friday morning period to Thursday morning. The transfer of the former standing Committee on International Relations to direct ASEE jurisdiction was also implemented. The title of the former Committee on Selection, Guidance and Placement was changed to Committee on Guidance.

The Executive Committee also concurred in the belief that ECAC committees, whether standing or ad hoc committees, should function whenever particular problems arose which warranted committee study and that generally, committee assignments should be by referral

primarily from the Executive Committee. This does not preclude initiation of suggestions for projects or missions by the committees. However, any such proposals are to be opproved by the Executive Committee before a committee undertakes a specific task.

Guidance: Coordination between the Committee and the ECPD Guidance Committee has now been achieved for three years with desirable results. A joint meeting with regional ECPD Guidance Committee personnel attending the ASEE Annual Meeting was held on June 28 at Lexington. A cooperative session on pre-college guidance was held on June 29. An informal meeting was also held with industry college relations personnel on the matter of pre-college engineering guidance publications.

Secondary Schools: The Joint Conference sponsored by the committee at Purdue in June 1960 with English, Humanities, Chemical Engineering, Mathematics and Physics Divisions was highly successful and was attended by a large number of secondary school people in the Purdue area. Similar conferences are not needed every year but could well be repeated at subsequent Annual Meetings.

Faculty Recruitment: Seventeen deans representing all of the ASEE sections in the country were appointed to this committee. They were asked to stimulate efforts on the part of the schools in each section to further the work of faculty recruitment so that highly qualified young men would be attracted to careers in engineering teaching in the years ahead. It is of interest to note that almost every school in the country ordered and distributed large quantities of the two brochures, "The Road to Graduate School" and "Teaching Tomorrow's Engineers." Many schools have definite programs for interesting their best students in teaching.

An interesting meeting of Institutional Representatives was held on Thursday morning, June 29, at the University of Kentucky devoted to the three major topics: (1) ECPD Accreditation, (2) Evaluation of Faculty Members for Merit Increases and Promotions, and (3) the Proposal to Establish a National Academy of Engineering.

ECRC Bylaws — Corrected

In the 1961 Yearbook-Directory, a portion of Section III of the amended Bylaws of ECRC was omitted. The full text of Section III follows:

III. Membership

1. Active membership in the Engineering College Research Council may be granted only to institutions of higher education granting degrees in engineering, which normally require four or more years of academic study at the baccalaureate level or above, and which have one or more engineering curricula accredited by the Engineers' Council for Professional Development, or if not within its jurisdiction, must have one or more engineering curricula whose standards as judged by a competent accrediting agency are no lower than those of that Council, provided that appropriate research activity shall have existed at the institution for a period of at least three (3) years based on the following criteria: a) the research is conducted in close coordination with the institution's engineering educational program; b) there is administrative encouragement of research as evidenced by appropriately reduced formal teaching loads of faculty members to provide time for research; and c) the publications and reports resulting from engineering college research activities demonstrate that the faculty members have made productive use of the time available for research. The term "research" as used herein means original investigations including studies leading toward the discovery of new processes, devices, or materials and does not include routine testing. Membership may preferably be taken out by the insti-

tution in the name of its Engineering Experiment Station, Engineering Research Institute or Division, or Engineering College, School, or Department.

2. A member institution must maintain a high record of performance in engineering research to remain in good standing as an active member.

3. Associate membership shall be confined to libraries, associations, companies, or individuals having an interest in engineering research such as to warrant, in the opinion of the Executive Committee of the Council, affiliation with the Council. Associate members shall have no vote, but may otherwise participate in all of the activities of the Council.

4. An institution may be proposed for membership in the Engineering College Research Council by an official representative of any member institution who is familiar with the work of the institution proposed; or application for admission may be made directly by a responsible officer of the institution concerned.

5. Applications for membership in the Engineering College Research Council shall be addressed to the Secretary of the American Society for Engineering Education, who shall refer such applications to the Executive Committee of the Engineering College Research Council.

6. Membership shall be conferred by the Executive Committee of the Engineering College Research Council by a two-thirds vote of the members of the Committee, after the eligibility of the applicant for membership in the Council shall have been determined by the Executive Board of the American Society for Engineering Education.

7. Membership in the Engineering College Research Council may be cancelled by a three-fourths vote of the members of the Council present at a called meeting and upon the recommendation of the Executive Committee for such causes as (1) poor technical performance, (2) acts tending to bring the Council into disrepute.

8. The Executive Committee of the Engineering College Research Council may cancel membership in the Council for nonpayment of dues.

9. Each active member of the Engineering College Research Council shall be entitled to one vote. The vote for each institutional member shall be cast by the person authorized by the President of the Institution as its representative to the Council.

Candid Comments

This section is open to comments on articles in the JOURNAL or on engineering education in general. Send comments to the Editor, JOURNAL OF ENGINEERING EDUCATION, University of Illinois, Urbana, Illinois.

Deflection of Beams

I would like to comment on the suggestions offered by Professors Spencer and Niedenfuhr (April 1961 and June 1961 respectively) on the deflection of beams, in connection with earlier articles by Professor Niedenfuhr published in the JOURNAL.

From the educational standpoint the problem is one of introducing the "unit step function" at the level in which the students are not familiar with the "Laplace transformation" and therefore cannot use the unit step function to advantage.

An up to date presentation of how this objective can be attained without the use of the "Laplace transformation" is developed at some length in "An Introduction to the Mechanics of Solids" by Crandall and Dahl (McGraw-Hill, New York, 1959) under the "Singularity functions" on pages 98-104 and 364-373.

The use of singularity functions renders unnecessary the matching of ordinates and slopes under a load anywhere

along the beam and reduces the number of boundary conditions to the two end conditions.

One can easily see that singularity functions may also be used in the application of energy methods such as in Castigliano's Theorem.

It is sincerely hoped that the many advantages of this method will convince the educators in the field to give it a try in their classrooms.

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Lehigh University
Bethlehem, Pennsylvania

Random Thoughts on the Trumpler Memo

The memorandum that Dr. Paul R. Trumpler prepared entitled "Is Sponsored Research Destroying Our Universities?" (JOURNAL, April 1961, pp. 618-625) impels me to offer certain comments both as a University administrator concerned with sponsored research and as a member of the faculty of the Wharton School and the Graduate School of Arts and Sciences who has participated in sponsored research projects. I realize that I could prepare a rather long treatise outlining the differences between our philosophies with respect to this area, but I believe it more appropriate to offer specific comments on what I believe are mistakes or mistaken impressions that appear in Dr. Trumpler's memo.

In Chapter I Dr. Trumpler indicates that research contracts call upon the University to pursue research activities in specified areas of direct interest to the sponsor. Such areas he suggests are usually narrowly defined, e.g., elimination of Diesel engine noise, de-icing of aircraft windshields, etc. He suggests that rarely is a study as broadly defined as "study of vibrations in an elastic solid." I fear that this comment of Dr. Trumpler is an indication of a failure to consider the actual projects in operation at a great research institution such as the University of Pennsylvania. I need only cite the titles appearing in the report prepared by the Office of Project Research and Grants for the Trustees listing the contracts received by the University during the month of April, 1960. I shall not attempt to list them all, but a few illustrations should suffice. The titles are the brief statement of work appearing in the contract or the contract document on file in the Office of Project Research and Grants:

- Electronic Properties of Semiconducting Materials
- High Energy Protons, Particles and Nuclear Reactions
- Plasticity, Recovery, and Recrystallization of Metals
- Peripheral and Central Control of Mammalian Temperature Regulations
- Nature and Immunologic Properties of Anaplasma Marginal
- Protein Cytochemistry
- High Energy Physics and Theory of Elementary Particles

The above list is not intended to be inclusive and indeed, it must be admitted that some of the contracts are more narrow in their scope than the illustrations that have been offered. None, however, is as narrow as the titles suggested by Dr. Trumpler.

I would further offer the following quotation taken directly from a contract with the Department of the Army to show that a broad scope is by no means limited to the so-called grant making agencies:

Subject Work

> To conduct studies on the regulation of food intake and physical activity, and the control of obesity, generally along lines set forth in Contractor's Application for Research Contract, dated, 1 November 1957.

Dr. Trumpler suggests that the time limit for contract activity is specified frequently as one year and infrequently as long as five. In this matter he is undoubtedly correct and we can only say that recent developments pointing towards five year and even ten year programs indicate that the Government is becoming enlightened in this area and that we may look for an improvement in

the situation. It should be pointed out, however, that even when funds are limited to a one year period they are nearly always made available for longer periods if the faculty member so wishes and indeed without an undue amount of effort on his part in soliciting support for the additional period.

It is also suggested by Dr. Trumpler that reports prepared on sponsored projects are restricted with respect to the dissemination of research findings. This is certainly not true at Pennsylvania and I question that restrictions are too common in any outstanding institution. While restriction of information for the national security might be justified in certain cases, restriction for industrial security is never justified at an educational institution. The University of Pennsylvania will not restrict the publication of any material developed under an industrially sponsored program. At most, we would agree to delay publication for a period of not more than six months from the date that notice of intent to publish was given and where this was essential to protect a patent application that was *desired by the faculty member* and the sponsor.

In Chapter III Dr. Trumpler refers to a proposed project involving a graduate student and certain services of a digital computer and states that the work involved an $8,000 job, but that when the cost of the principal investigator's time, secretarial services, travel and indirect costs were included the job totaled to $20,000. He states that it is difficult to dismiss on suspicion that it does not take $20,000 of a sponsor's money to do an $8,000 job. My only comment here is that it is a $20,000 job; the only question is whether the additional $12,000 is to be provided from general University funds that otherwise might be used for unrestricted purposes such as faculty salaries or whether the sponsor should be asked to pay for the full cost of the program that he is sponsoring.

Further along in this same chapter Dr. Trumpler discusses the problems encountered by Professors X and Y in securing and maintaining a contract. I think that both individuals have failed to make use of the administrative structure provided by institutions to relieve faculty members of the onerous aspects of securing and maintaining of research contracts.

The statement to the effect that the personnel which does not engage in contract research is being supported by the contract overhead of others is actually false. The contract overhead of those others does nothing more than reimburse the institution for the indirect costs incurred on those projects. None of the overhead covers the costs of nor provides funds for the work of the person not engaged in contract research. The latter is supported only from general funds of the University.

At the conclusion of this chapter Dr. Trumpler raises the question concerning the tenure problem that can arise as a result of sponsored research projects. He implies that there is a difference between contract funds and other University funds. In answer I need only cite a resolution of the Trustees of the University of Pennsylvania together with certain remarks offered by the President prior to the adoption of the resolution which states quite clearly that the University of Pennsylvania considers its contract receipts or income no different from any other income of the University. The remarks of the President and the resolution follow:

Faculty Remuneration and Tenure vis-a-vis Grant and Contract Research Funds

During the past ten years there has been a steady growth of income from contract and grant research conducted at the University. The initial policy within departments was to regard income from this source as somewhat ephemeral and therefore to designate for remuneration from such funds only younger members of the staff in order that should such support be discontinued, the University's ability to discharge its tenure obligations would not be jeopardized. As a result of the magnitude of sponsored research and the reasonably uniform continuity of available funds, it would appear desirable to reevaluate University policy with a view to considering income from this source as equivalent of that from other sources. Under such a philosophy research funds

would be incorporated in the basic budget structure and members of the faculty would be compensated from this source without reference to the permanency of their appointments. This is suggested in part as a result of the fact that tenure is normally accorded to individuals under present University policy without regard to the source of funds contributing to the remuneration of the individual. The policy advocated would not, however, preclude the possibility of making some appointments for the duration of a specific grant or contract in order to meet special circumstances in which terminations of various programs or contracts can be foreseen within a comparatively brief number of years.

Resolution:

RESOLVED, That it be established as University policy in budgetary procedures that funds received through grant and contract research activities be treated in the same fashion as other ordinary income of the University.

In Chapter IV Dr. Trumpler says that universities might well cease to exist if academic research is destroyed. With this statement one cannot help but agree, for certainly research is an integral part of university life. All research is sponsored, whether it be sponsored by the university itself, by an outside agency, or even by a donor. The source of funds does not restrict academic freedom nor hamper academic research. It is the manner in which these funds are administered within the university. A sound administration and an outstanding faculty will provide all the safety checks and balances that are essential to maintain these freedoms. One must agree with Dr. Trumpler's comment that society will not be well served if universities are forced to place slot machines in the halls or to operate an entertainment business or engage in semi-professional sports. However, his suggestion that research at a university that is sponsored by outside organizations falls in the same category can hardly be taken seriously.

Finally, Dr. Trumpler offers his suggestion concerning the outside support of research and at this point I believe we are in close agreement. He says that proper support will be characterized by one general principle that "it will not to any significant degree influence the free formulation by the university of its research policy and the allocation of research funds in accordance with needs determined within, not outside, the university." The University of Pennsylvania's research program so far as I know operates under these principles. The University's current contracts and grants meet these criteria.

DONALD S. MURRAY
Professor of Statistics and
Comptroller*
University of Pennsylvania

June 9, 1960

*Director of Project Research and Grants at time this was written.

Deflection of Beams

The note by Prof. Spencer in the JOURNAL OF ENGINEERING EDUCATION, Vol. 51, No. 8, mentions the investigation by W. H. Macaulay. The method is well known in this country as "Macaulay's Method." However, this use of a step function for the determination of elastic members subject to bending is only a particularly simple case of the much more general Heaviside step function or Laplace transform method. The problem of concentrated loads on a beam is analogous to a pulse voltage applied to an electrical network. Operational methods suitable for the latter problem are well established, the Laplace transform or Heaviside step function being applied to a time function whereas the function is one of position in the beam problem.

It appears that the first application of a step function to beam problems was by Clebsch (1) in 1862 and the method was also used by Föppl (2). The first reference in English is that due to Macaulay (3) and extensions are given by Case (4), Brown (5), Goldberg (6), Todd (7) and Sackman (8). Probably the most suitable treatment of the application of the Laplace transform to problems in the theory of structures is given by Pipes (9), or Iwinski (10).

References:

(1) A. Clebsch, *Theorie der Elasticität Fester Korper*, 1862. P. 389.
(2) A. Föppl, *Festigkeitslehre*, 5th ed., 1914. P. 124.
(3) W. H. Macaulay, "Note on Deflection of Beams," *Messenger of*

Mathematics, Vol. 48 (1919), p. 129.
(4) J. Case, "Strength of Materials" 2nd ed. Arnold & Co. London, 1932. P. 169.
(5) C. L. Brown, "The Treatment of Discontinuities in Beam Deflection Problems," *Quarterly of Applied Mathematics*, Vol. 1 (1943), p. 349.
(6) J. E. Goldberg, "The Application of Heaviside's Step-function to Beam Problems," *Proc. A.S.C.E.*, Vol. 79, Separate No. 202 (June 16-19, 1953).
(7) J. D. Todd, "An Extension of Macaulay's Method," *Civil Engineering and Public Works Review*, Vol. 55. No. 651 (Oct. 1960), p. 1279.
(8) J. L. Sackman, "Deflections of Beams with Internal Hinges," *Civil Engineering*, March 1961, p. 67.
(9) L. A. Pipes, *Applied Mathematics for Engineers and Physicists*, 2nd ed., McGraw-Hill Book Co., Inc., New York, 1958. P. 245.
(10) T. Iwinski, *Theory of Beams*, Pergamon Press, New York, 1958.

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Engineering Design

The report of the M.I.T. Committee on Engineering Design (April 1961 JOURNAL OF ENGINEERING EDUCATION) makes most heartening reading for those who believe that engineering students should have some chance to develop the ability to design. Present policies in recruiting engineering teachers may result in faculties a majority of whose members have the mistaken notion that an extensive knowledge of analysis is not only necesssary for design, but must precede any practice of it.

Although the impetus that different relative amounts of training can give toward either analysis or design is important, inherent differences in the individual flavor of native ability may be just as important. I have had students who were unable to master indeterminate structure theory despite intense determination and prolonged effort, and yet have become successful designers. On the other hand, some who found this subject easy have remained analysts, either unwilling or unable to assume the designer's responsibilities.

The Committee is right in stating that faculties should include some successful designers. But this is not enough; some successful designers are entirely "closed-end" in presenting material to students. Part of their skill may nevertheless "rub off" on the students, but more effective instruction can result from studying how the successful designer functions and devising methods of training the student to do likewise.

The Committee's important point is that the engineering student should be exposed to some design-oriented training in the first year, and this training should be continued throughout his course. While the early courses obviously cannot utilize the range of engineering science that will be available later, they can introduce "open-end" problems as opposed to "closed-end" problems, which dominate many engineering courses so thoroughly that a student can graduate without ever having had the slightest taste of what design is really like. Proportioning for economy, often called design, is only a small part of the designer's work.

As to what the early courses might be, I'd like to suggest the much maligned courses in surveying. They are replete with "open-end" problems. They require cooperation with fellow engineers. In the hands of competent, experienced instructors they can be among the most valuable courses in the engineering curriculum, for they are available at a very critical stage in the development of the embryo designer. The emphasis should not be coverage, or "how-to-do-it," but practice in the individual application of basic knowledge, subject to careful review with "accepted methods" being introduced only when necessary.

C. J. POSEY
Professor and Head of Civil Engineering
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Iowa City

Section Meetings

Section	*Location of Meeting*	*Dates*	*Chairman of Section*
Allegheny	Pennsylvania State University	April 27 & 28, 1962	O. E. Lancaster, Pa. State University
Illinois-Indiana	Univ. of Notre Dame	May 12, 1962	E. W. Jerger, Univ. of Notre Dame
Kansas-Nebraska	Kansas State University	Oct. 27 & 28, 1961	M. H. Snyder, Jr., Univ. of Wichita
Michigan	Wayne State Univ.	April 7, 1962	J. S. Johnson, Wayne State Univ.
Middle Atlantic	Columbia University	Dec. 1961	J. G. Truxal, Brooklyn Poly. Inst.
Missouri-Arkansas	Univ. of Arkansas	April, 1962	J. L. Imhoff, Univ. of Arkansas
National Capital Area			G. L. Hickox, Alexandria, Virginia
New England	Brown University	Oct. 13 & 14, 1961	E. F. Littleton, Tufts University
North Midwest	Mich. Coll. of Mining & Tech.	Oct. 6 & 7, 1961	C. E. Work, Mich. Coll. of Mining & Tech.
Ohio	Ohio University	April, 1962	L. F. Hicks, Ohio University
Pacific Northwest	Washington State University	April 27 & 28, 1962	L. D. Luck, Wash. State Univ.
Pacific Southwest	Las Vegas, Nevada	Dec. 27 & 28, 1961	A. C. Ingersoll, Univ. of Southern Calif.
Rocky Mountain	Univ. of Colorado	April 28, 1962	H. E. Johnson, III Univ. of Colorado
Southeastern	Vanderbilt University	April, 1962	L. E. Schoonmaker, Univ. of Florida
Southwest	Texas Tech. College	April 6 & 7, 1962	I. W. Roark, Univ. of Tulsa
Upper N. Y.-Ontario	Clarkson College	Oct. 6 & 7, 1961	R. D. Larsson, Clarkson College

Mid-Winter Meetings - 1962

Cooperative Education — Jan. 22-24, 1962 — Washington, D. C.
Information: M. J. Vaccaro, Goddard Space Flight Center, Greenbelt, Md.

Engineering Graphics — Jan. 1962 — University of Wisconsin
Information: K. G. Shiels, Assistant Dean of Engineering, University of Wisconsin, Madison, Wisconsin.

College-Industry Conference — Feb. 1-2, 1962 — Worcester Polytechnic Institute
Information: Bernard L. Wellman, Prof. of Mech. Eng. & Head, Drawing Division, Worcester Polytechnic Institute, Worcester, Massachusetts.

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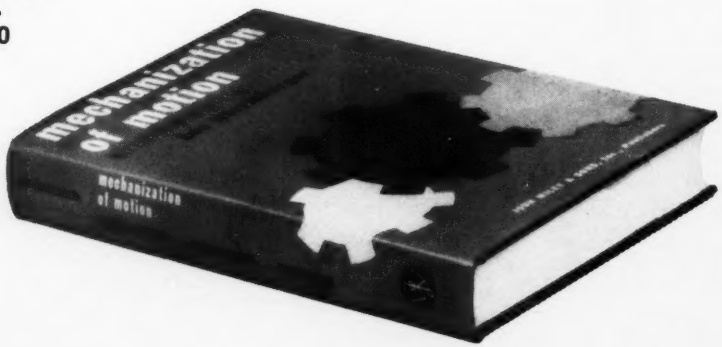

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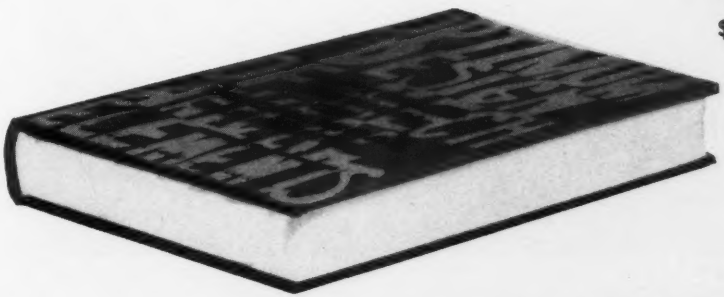

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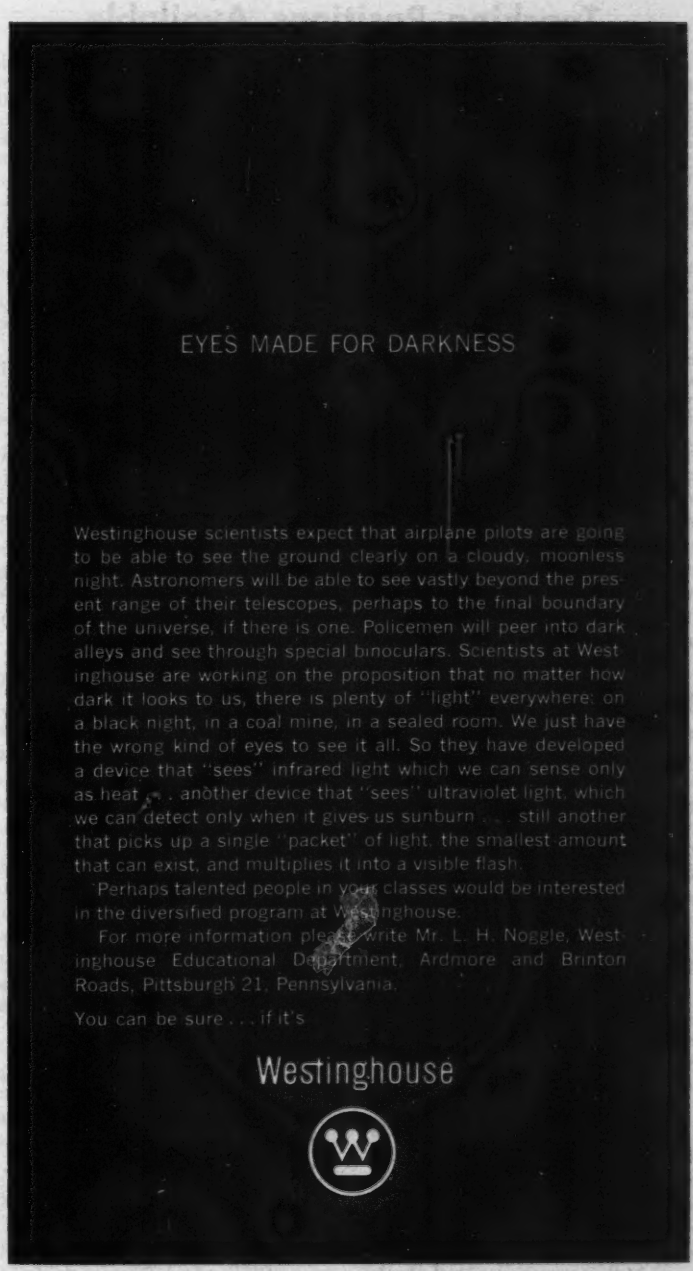
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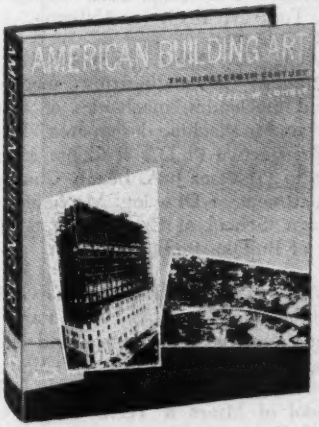

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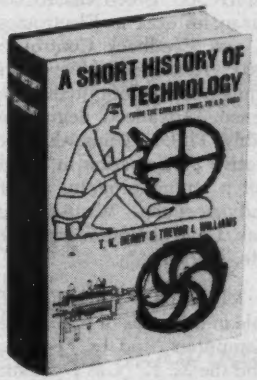

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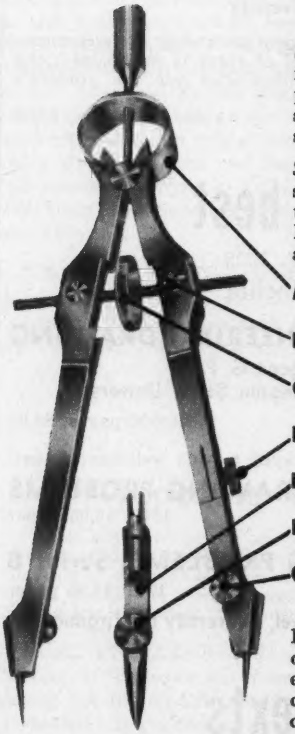

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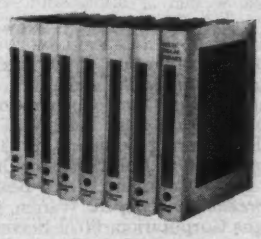

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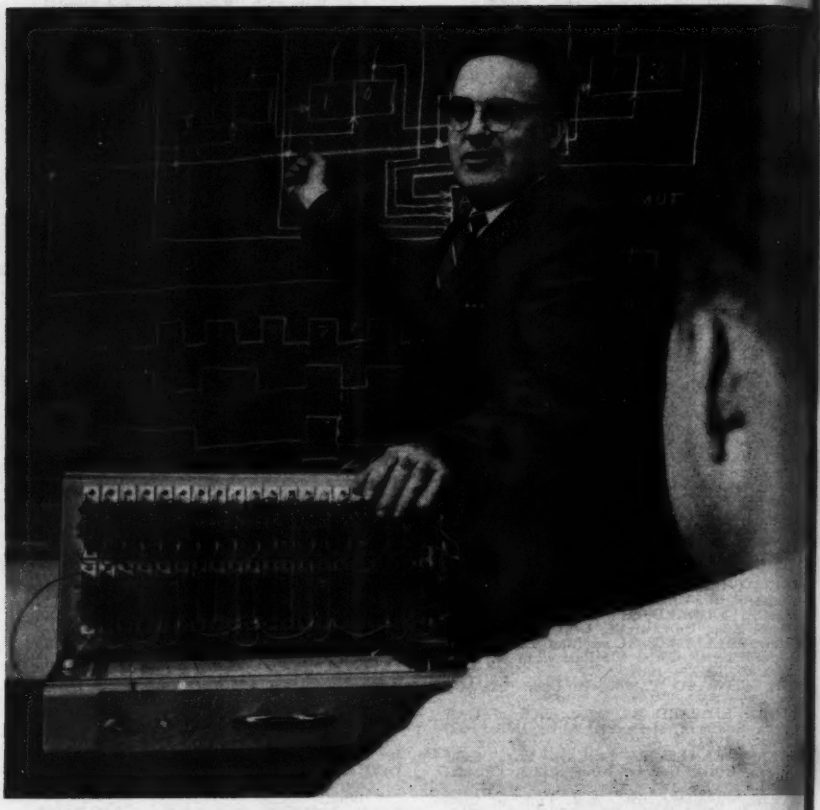

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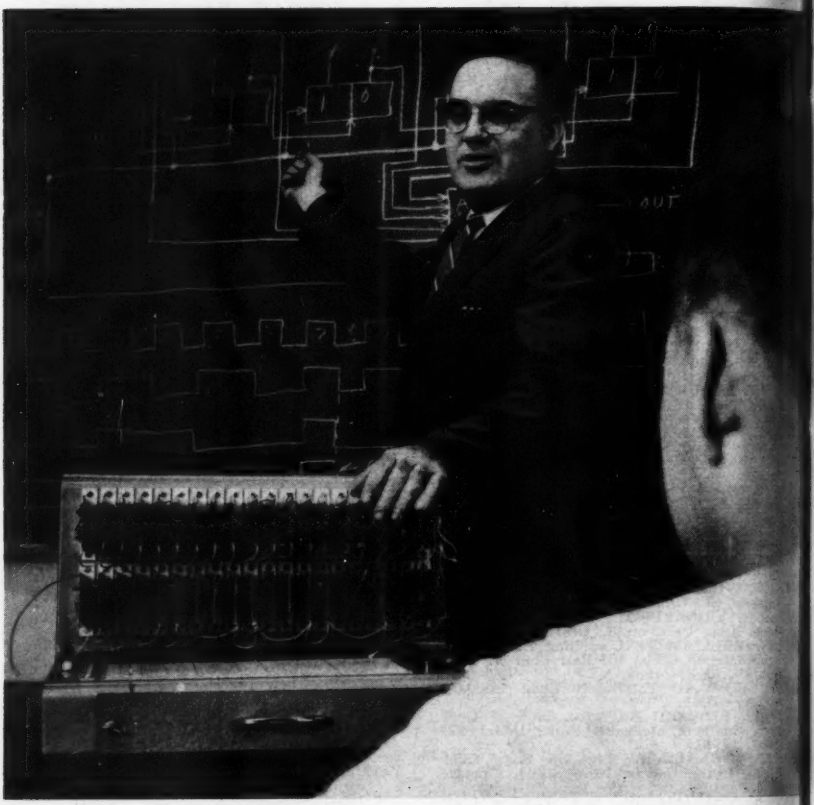

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